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Domestic Life during the Late Intermediate Period at El Campanario Site, Huarmey Valley, Peru

Jose Luis Peña
University of South Florida

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by

Jose Luis Peña

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of the requirements for the degree of
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Department of Anthropology
College of Art and Sciences
University of South Florida

Major Professor: Robert H. Tykot, Ph.D.
E. Christian Wells, Ph.D.
Nancy White, Ph.D.
David Chicoine, Ph.D
Mary Glowacki, Ph.D.

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DEDICATION

I dedicated this dissertation to my beloved wife Patti Peña for her constant support and patience during this incredible journey, and to my twins, Christian and Anna, for their constant love and hugs in times when I need them the most. A special thanks to my parents Jose and Rosa Peña for their words of encouragement that helped me go through the most difficult times of this journey.

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ABSTRACT

This dissertation investigates domestic activities conducted at El Campanario, an important settlement in the Huarmey Valley which is located in the north-central coast of Peru. The archaeological excavations and material analyses conducted at El Campanario for this dissertation revealed the presence of a characteristic ceramic style containing incised and press-molded decoration. This distinctive ceramic style is commonly denominated Casma and can be found along the Peruvian coast between the Chao Valley to the north and the Huarmey Valley to the south. The excavations were conducted in domestic contexts which were identified from the surface based on food remains and large vessels for cooking and storing. The results presented in this research are based on 10 weeks of fieldwork at El Campanario. In addition, pottery analysis, textiles, marine resources and plant remains were also analyzed so as to understand the activities conducted within the households. This research is oriented to the observation of household organization and production activities in the Huarmey valley in order to examine the relationship between the inhabitants of El Campanario site to other Casma sites and cultural groups.

The archaeological excavations conducted in domestic contexts have provided substantial information to reconstruct subsistence practices, access to food sources and raw materials, as well as the identification of ceramic, textile and *chicha* production. Evidence suggests that production and subsistence practices (processing and cooking) were embedded in daily activities without the direct supervision of local elite or a centralized government.

The research conducted at El Campanario revealed that residents mostly produced and used ceramics decorated with incised and press-molded techniques. These ceramic decorations are found along the north-central coast of Peru and they are commonly associated with the Casma style. However, El Campanario inhabitants also had access to foreign cultural knowledge and they developed an independent cultural expression in their search for their own cultural identity.

CHAPTER ONE:

INTRODUCTION

The present dissertation is oriented to the analysis of domestic activities and the manner in which El Campanario inhabitants used their surrounding landscape to obtain resources needed for ceramic and textile production as well as for food production. This research addresses the daily practices approach in order to understand how households participated in the production of identity and cultural heredity. Its purpose is to contribute to understanding the role of households in the production and sustaining of culture, and how cultural identity is constructed at the local level. While the presence of Casma material culture is significant at El Campanario, the location of the Huarmey valley allowed household inhabitants access to the cultural expression of the central coast and highland. The data for this dissertation were obtained through archaeological excavations in domestic areas at the site of El Campanario. While the emphasis of this dissertation is ceramic production, the good preservation of other materials, such as textiles and botanical remains, allows the observation of various activities performed by household members at the site. The technological knowledge for the production of craft goods and access to foreign material culture could have allowed El Campanario residents the opportunity to develop their own cultural identity. Households were not just a passive context that is affected by external cultural transformation, but instead, were the cultural context that actively participated in the transformation of culture.

1.1 Household Research

In Andean societies households are the most basic economic unit. Besides craft production, domestic activities included preparation and consumption of food which required the organization of labor in order to satisfy household members' needs. The intensity of household production may have been related to the complexity of the sociopolitical organization of each polity.

The archaeological study of households provides information about economic systems (Hastorf 1990), the interaction between states and local organizations (Bray 2003), gender division of labor (Gero 1992), and social differences (Gumerman 1991). In addition, the preparation and consumption of food provides information not only about the access to natural resources and their distribution, but also about social changes (Cutright 2013).

Household organization of labor during the Late Intermediate Period (A.D. 1000-1400) in the Huarmey Valley (North Coast of Peru) offers a unique context in which political and economic organization, as well as intercultural exchange, can be explored. Excavations at the site revealed that El Campanario residents conducted various activities related to the procurement of food resources, processing and cooking, as well as production of craft goods. The domestic areas at the site were occupied at the beginning of the Late Intermediate Period and abandoned before the Chimú presence in Huarmey which occurred after A.D. 1350 (Moore and Mackey 2008). The various cultural expressions observed in domestic life at El Campanario offer the opportunity to examine household organization in borderlands as well as the intercultural relations and long-distance exchanges which occurred among non-elite groups. Borderlands were not just the political or cultural division of an ethnic group or polity, but also areas where cultural exchange occurred, providing individuals or groups the opportunity to observe new ideas and cultural practices.

While archaeological excavation has been conducted at other Casma sites, the nature of Casma political organization is still debated. Melissa Vogel (2018) suggests that Casma was a confederation of regional elites who shared common cultural practices which might have been organized under a centralized government at some point of their cultural history (Vogel 2018:175).

Research at El Campanario was oriented towards understanding the manner in which household residents organized labor in order to fulfill a wide range of domestic activities. This study allowed not only observation of the role of household production in the local economy, but also the manner in which the household economy was incorporated into a larger economic system. In addition, the permeable nature of the Casma border allowed the introduction of new cultural ideas in which the household participated directly in their incorporation into the existing Casma culture.

1.2 Research Objectives

The research conducted at El Campanario was oriented towards the understanding of household production, interregional exchange and their roles in a larger economic and political system. In order to assess the nature of household activities, I put forth the following research questions:

How did household members organize labor in domestic activities?

I expected to find household signatures of various activities as well as the use of space in relation to productive activities. If El Campanario households extracted and transformed natural resources, I expected to find faunal and botanical remains as well as grinding stones and mortars within the households. In order to observe these activity patterns I analyzed artifacts and organic remains within each excavated unit. In addition, evidence of craft production would be visible within household spaces through the concentration of artifacts such as spindles, spindle whorls, looms, ceramic molds, unfired ceramics, and kilns. Household production was oriented towards satisfying the needs of household members, local elite, or as part of a larger tribute system. The identification of specialized production within domestic contexts is through the presence of residues of the goods produced that exceeds the expected auto-consumption of the domestic group (Costin 1991, 2001; Schortman and Urban 2004). The concepts of full-time and part-time craft production did not provide an understanding of the function and structures of domestic craft production, and thus the emphasis, according to Hirth (2009), should not be on the amount to time spend in the production of craft, but on the economic strategies used by domestic groups and how craft production was integrated into their domestic economy. For this reason, food production cannot be studied separately from craft production, since the responsibilities of specialists did not change the other productive activities performed within the household (Hendon 1996).

Was pottery production under elite or state supervision?

Pottery production was an important activity in Andean societies and objects were used as objects of prestige that contained elaborated imagery as well as for domestic activities such as cooking and storage of food. Evidence of pottery production at El Campanario consisted of ceramic molds, small smooth stones (polished stones), wasters and kiln. If the pottery production was controlled by the Casma state or the ruling elite, I would expect to find evidence of pottery workshops. The context in which craft production is organized can be divided into attached and independent, where attached artisans are controlled by the ruling elite or elite groups in order to produce restricted goods. On the other hand, independent artisans are free from elite control and produced objects for a wide range of consumers (Brumfiel and Earle 1987; Costin 1991; Earle 1987). In order understand the context of pottery production at El Campanario I consider the spatial distribution of ceramic molds, polishing stones, wasters and kilns in each excavated unit.

Did El Campanario households had access to foreign material culture and ideas?

The presence of foreign ceramic styles in the Huarmey Valley during the Late Intermediate Period was reported by Ernesto Tabio (1977). Two black/white Chancay ceramic vessels were obtained from a looted prehispanic cemetery and could indicate the long-distance exchange between Huarmey and the central coast of Peru (Tabio 1977:142). Cultures do not develop in isolation but often they engaged or were influenced by neighboring groups which allowed the incorporation of foreign elements into their own symbolic system (Bawden 2005:15). Exchange networks could have provided the household with access to new resources and belief systems that may have changed the activities and social relations at the household level (Marcone 2010). Evidence of interregional exchange between the Casma polity and neighboring groups was found at El Purgatorio (Casma capital). Pottery vessels showing various styles from the highland, north and central coasts were recovered from a cemetery at El Purgatorio (Vogel 2011, 2016). Charles Stanish (2005) argues that exotic goods appeared in more number in burial contexts while residential areas tended to have low quantities of exotic materials. In addition, domestic contexts are more conservative in preserving ethnic markers rather than funerary contexts (Stanish 2005:229-230).

In order to determining the presence of foreign artifacts or ideas I analyzed ceramics and textiles from each excavated unit that were decorated using traditions from the highlands or the central coast of Peru. The presence of foreign ideas in household production at El Campanario might indicate a cultural syncretism in which the households not only obtained ideas from foreign ethnic groups, but also transformed and incorporated those ideas into the existing culture.

1.3 Organization of the Dissertation

Chapter 2 focuses on the cultural changes occurred during the decline of the Middle Horizon (A.D. 600-1000) and the development of northern coastal polities during the Late Intermediate Period (A.D. 1000-1400). While there is substantial archaeological and ethnohistorical information on the Lambayeque/Sican and Chimú polity, the Casma polity has received little archaeological attention and their socio-political organization is still a topic of debate.

Chapter 3 addresses archaeological research conducted on the Casma Polity in each of the coastal valleys in the north of Peru. It also describes the overall political organization and settlement patterns of the Casma Polity. In addition, this chapter discusses the chronology of the Casma and its relation to the material culture in each valley.

Chapter 4 covers theoretical models used to interpret households, craft production, and communities of practice in order to understand the organization of household labor. It also offers an understanding of the relationship among communities, individuals and the landscape as well as the nature of the borderland in order to observe the dynamic nature of household activities.

Chapter 5 presents an overview of the environment in the Huarmey Valley including information concerning the geological formations which is important to understand the procurement zones for pottery production. In addition, natural resources allow to observe the subsistence strategies used by the El Campanario inhabitants. Finally, this chapter provided the cultural history of the valley and the cultural changes which occurred during different time periods.

Chapter 6 describes the archaeological research conducted at El Campanario, including previous research conducted at the site. This chapter also discussed the research design, the description of the site and excavation process including the findings in each archaeological unit excavated during the fieldwork portion of this dissertation research.

Chapter 7 describes household architecture such as construction techniques and materials used at the site. This chapter also provides the results of botanical, faunal and marine resources found during the excavations. In addition, this chapter includes the analysis of ceramics (forms and decoration), textiles, lithic artifacts, and wooden objects.

Chapter 8 focuses on the ceramic paste analysis in order to observed changes in the paste composition of ceramic vessels. The variation in paste composition allowed to organize the ceramic samples into six paste groups. In addition, compositional analyses were conducted on ceramics to determine the provenience of the clay used in the manufacture of pottery vessels.

Chapter 9 addresses the domestic activities conducted at El Campanario. The access to agricultural, marine and terrestrial faunal are describe in this chapter. Besides the activities oriented to the extraction of resources, food processing and cooking are activities observe within domestic areas. Furthermore, craft production such as pottery, textile and *chicha* were also part of the domestic activities at the site.

Chapter 10 addresses the daily life within domestic areas which included the various tasks conducted by household members including food preparation as well as productive activities.

Furthermore, food consumption within the household was observed and possibly domestic areas might have engaged in small scale feastings among various households

Chapter 11 is dedicated to the conclusion of this dissertation which used the theoretical approaches described in Chapter 4. While the manufacture of ceramics and textiles are important household activities they cannot be separated from the overall household economy. Furthermore, the knowledge of their landscape and the learning process of household members in order to conduct various daily tasks cannot only have occurred within the household but instead as part of the community. Finally, the access to foreign material culture or knowledge allowed El Campanario inhabitants to develop their own symbolic material culture.

CHAPTER TWO:

THE NORTH COAST OF PERU DURING THE LATE INTERMEDIATE PERIOD

2.1 The Middle Horizon on the North Coast of Peru

The Middle Horizon (A.D. 600-1000) in the central Andes is commonly associated with the spread of the Wari material culture (Figure 2.1). The Wari polity is viewed as an expansive state with centralized authority along with an administrative system established to extract resources and labor from the conquered territories (Isbell 1987, 1997, 2001; Isbell and Schreiber 1978; Lumbreras 1974; McEwan 1991, 2005; Menzel 1964, 1968; Schreiber 1987, 2001, 2012). In addition, the use of local elites to expand the state enabled the Wari to consolidate control over specific regions, and in this context, a bureaucratic hierarchy of control was easily integrated into a larger political-territorial hierarchy (Schreiber 1992:15). Alternative interpretations of the centralize model suggest that local populations emulated Wari elements into their own communities without direct political control of the Wari polity (Marcone 2010; Segura and Shimada 2010; Shady 1988). The prestige exchange network model has recently been used to interpret the presence of Wari material culture in the Andean region. In this scenario, the sociopolitical transformation that occurred during the Middle Horizon was the result of internal changes whereby the local elite participated in a wider exchange of cultural ideas, rather than the result of Wari hegemony (Jennings 2010; Lau 2005). The emergence of regional polities produced an intensive exchange of prestige goods that allowed the development of state-level societies

(Shady 1988). In the northern coast of Peru, the distribution of Wari items was limited to some areas (Chapdelaine 2010), in which Wari pottery appeared in mortuary contexts along with local pottery decorated with Wari inspired motifs (Castillo 2001).

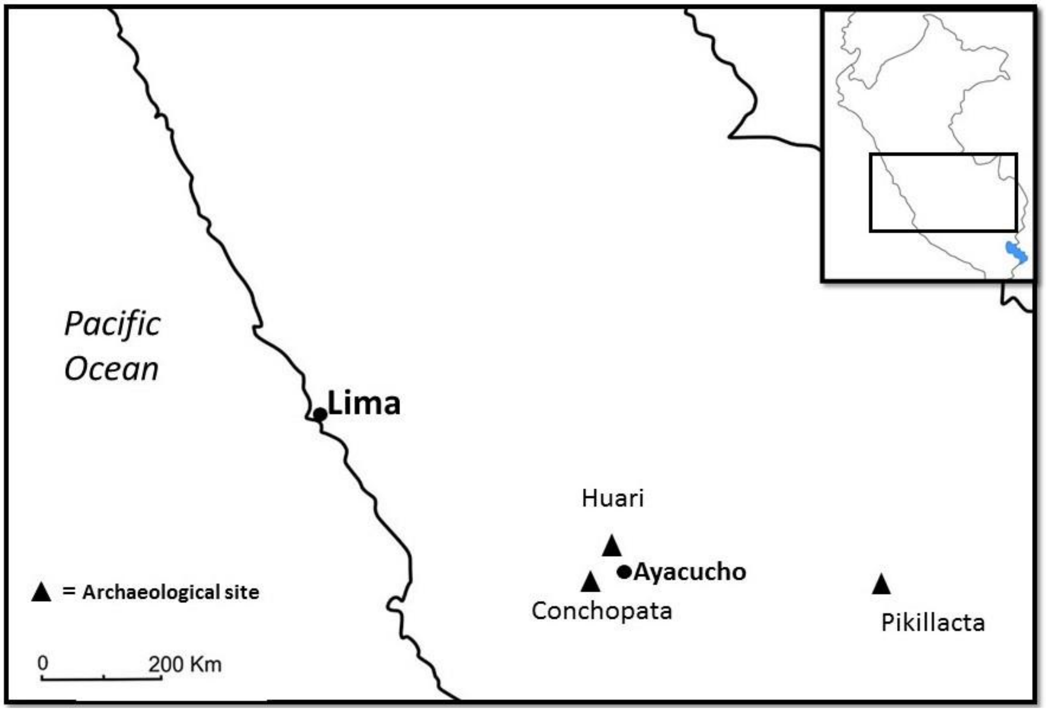

Figure 2.1: Map of important Wari archaeological sites

Archaeological evidence suggests that along the northern coast, Wari influence appears to have been minimal and some coastal polities, such as Moche, resisted its influence in the highland (Chapdelaine 2010); however, burial contexts at the San Jose de Moro site indicate that the Wari pottery style had some influence during the Late Moche Period (Castillo 2001). Around the second half of the Middle Horizon (A.D. 800-1000), the northern coast of Peru experienced various sociopolitical transformations that accompanied the decline of the Moche style in the Nepeña Valley around A.D. 800 (Trever 2017:9), and the presence in the Casma and Huarmey Valleys of new Middle Horizon styles from Pachacamac (Kroeber and Strong 1926; Menzel 1968, 1977) and the Callejon de Huaylas (Menzel 1968; Paredes el at. 2000). While the Middle Horizon is commonly associated with the spread of Wari material culture, I did not use this term to emphasis the presence of Wari artifacts, but rather to illustrate the chronological period between the onset of the Moche culture and the development of state level societies. The decline of the Moche ceramic in the valleys of the northern coast of Peru initiated the rise of local polities such as the Sican/Lambayeque and Chimú Polities in the northern coast and the Casma Polity in the southern part of the northern coast of Peru (Table 2.1). These polities developed during the end of the Middle Horizon as small social organization, which subsequently reached high levels of political organization and centralization incorporating various coastal valleys. In addition, these cultural transformations might have produced the increased population in each valley and the expansion of agricultural land.

Table 2.1: Chronology of the North Coast of Peru (adapted from Moseley 1992)

<table>
<tr><th>Time</th><th>Horizon/Period</th><th>Lambayeque Valley</th><th>Moche Valley</th></tr>
<tr><td>1600</td><td rowspan="2">Late Horizon</td><td rowspan="2">Inca</td><td rowspan="2">Inca</td></tr>
<tr><td>1500</td></tr>
<tr><td>1400</td><td rowspan="5">Late Intermediate Period</td><td rowspan="2">Chimú</td><td rowspan="5">Chimú</td></tr>
<tr><td>1300</td></tr>
<tr><td>1200</td><td rowspan="5">Lambayeque/Sican</td></tr>
<tr><td>1100</td></tr>
<tr><td>1000</td></tr>
<tr><td>900</td><td rowspan="4">Middle Horizon</td><td rowspan="4">Moche</td></tr>
<tr><td>800</td></tr>
<tr><td>700</td><td rowspan="2">Moche</td></tr>
<tr><td>600</td></tr>
</table>

2.2 The Sican/Lambayeque Polity

The Sican/Lambayeque Polity occupied a territory composed of the valleys of La Leche, Lambayeque, and Zana. This polity has been the focus of intensive archeological research since 1978 by the Sican Archaeological Project. While the origins are poorly understood, Izumi Shimada has divided Sican culture into three phases, namely Early, Middle and Late Sican (Shimada 1981, 1990, 2000). Although Early Sican has been assigned to the latter half of the Middle Horizon, the period of Sican cultural flourishing occurred during the Middle Sican phase (A.D. 900-1100). This phase is associated with the construction of monumental architecture within the Sican Precinct at the site of Batan Grande, which was the religious and political capital of the Middle Sican phase (Shimada 1990, 1995).

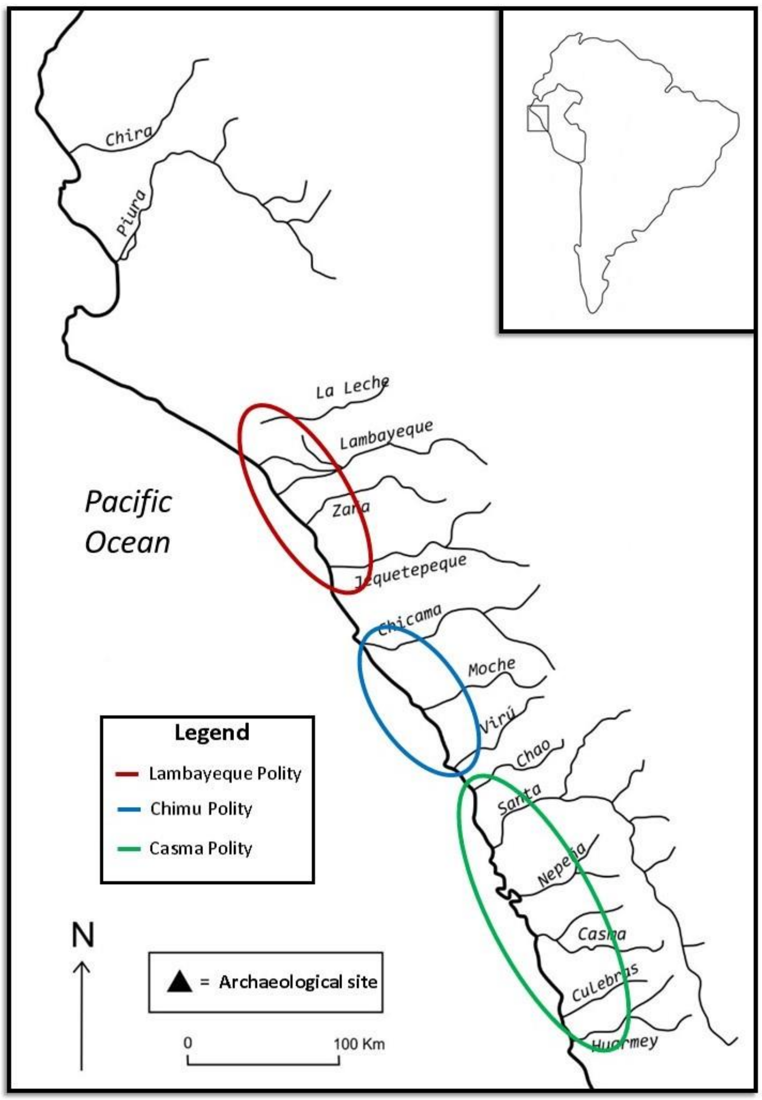

Figure 2.2: North Coast polities before A.D. 1300
(adapted from Moore and Mackey 2008; Vogel 2018)

In addition, the Middle Sican phase developed a formal belief system in which the Sican Lord image was the central figure in Middle Sican iconography, an image that was the result of iconographic syncretism which incorporated Moche and Wari features (Shimada 1990:359). The political organization of the Sican/Lambayeque Polity during the Middle Sican phase showed levels of socio-political integration observed in the organization and control of resources, including labor, and differences in social classes along with centralized and hierarchical administration (Shimada 2000).

During the Late Sican phase (A.D. 1100-1375) the Sican Precinct at Batan Grande was abandoned and the image of the Sican Lord disappeared from Sican iconography (Shimada 1990). The abandonment of Batan Grande was accompanied by the intentional destruction of religious centers as a response to changes in environmental conditions. Around A.D. 1050-1100, severe droughts reduced the amount of water and agricultural productivity, causing the abandonment of previous religious beliefs that culminated in the destruction of religious structures (Shimada 2000:61). After the abandonment of Batan Grande, the site of Tucume became the new center of the Sican Polity during the Late Sican phase. According to Shimada, the new Sican center of Tucume, and especially the site of El Purgatorio (La Leche Valley), symbolized the unification of dispersed elite groups into an inter-valley polity (Shimada 2000:63). Later, the Chimú expansion incorporated the Sican Polity around A.D. 1350 (Shimada 1990).

The presence of Sican/Lambayeque material culture (ceramics, architecture, etc.) outside of the heartland has been interpreted as evidence of direct control or administration that characterized centralized authority (Castillo 2001; Prieto 2010; Shimada 2000). Other researchers believe that Sican/Lambayeque participated in a long-distance exchange that included present day Ecuador, Colombia and the Cajamarca and Marañon regions where the Sican political organization was composed of a confederation united through cultural and stylistics ties (Conlee *et al.* 2004). An alternative model for the Sican/Lambayeque socio-political organization is based on archaeological research conducted in the Jequetepeque Valley. According to William Sapp (2011), the development of the Sican/Lambayeque socio-political organization and religious belief occurred independently. The significant difference between the Lambayeque Norte (La Leche and Lambayeque Valleys) and the Lambayeque Sur (Jequetepeque Valley) suggests the presence of two separate polities (Sapp 2011:102).

2.3 The Chimú Polity

The Chimú Polity developed in the valleys of Moche and Chicama after the collapse of the Moche around A.D. 900. At the same time, the Chimú started the construction of the city of Chan Chan, which became the capital city of the Chimú Empire. Archaeological research conducted in the Chimu capital has revealed the presence of large walled compounds, or *ciudadelas*, which were used by the ruling class, as residential areas, as well as ceremonial mounds, or *huacas.* The *ciudadelas* were built at different times and required constant modification of the city's urban layout (Kolata 1990). Each *ciudadela* could have served as a palace which might be related to different Chimú rulers (Moore and Mackey 2008; Pillsbury and Leonard 2004). In addition, the *ciudadelas* contained large numbers of storerooms as well as U-shaped structures called *audiencias* (Klymyshy 1987; Kolata 1990; Topic 2003). These *audiencias* were built not only at Chan Chan but also in every other administrative center within the Chimú territory as a symbol of state authority (Keatinge 1982; Mackey 1987). They are often located near storerooms, which suggests that the *audiencias* were administrative offices in charge of the control of the storage and distribution of goods (Keatinge 1982:203-204).

The expansion of the Chimú Empire occurred in different stages. After consolidating their presence in the Moche and Chicama Valleys (A.D. 900-1200), the Chimú incorporated the Jequetepeque Valley in the north around A.D. 1320. Expansion to the south occurred around A.D. 1350 when the Chimú incorporated the Casma Valley and incorporation of the Sican/Lambayeque polity occurred between A.D. 1360 and 1400. The dates for the expansion to the south of the Casma valley are still unknown (Moore and Mackey 2008).

Archaeological research conducted at Chimú sites outside the heartland (Moche Valley) has allowed us to understand the strategies of imperial expansion and the administration used by the Chimú Empire in the provinces. Various Chimú architecture identified in coastal valleys has been used to establish three different hierarchies in administrative centers (Keatinge and Conrad 1983; Mackey 1987; Mackey and Klymyshyn 1990; Topic 1990). As part of the Chimú administration in the provinces various administrative centers were built along the north coast of Peru. Here I will discuss the sites of Farfan and Manchan which have received more attention by archaeologist since they are considered Chimú regional administrative centers.

The site of Farfan is located in the Jequetepeque Valley and was the regional administrative center of the Chimú Empire in the northern territories. While this site had been assigned to the Chimú, archaeological excavations conducted by Carol Mackey show that the Sican/Lambayeque polity started the construction of Farfan around A.D. 1100 (Mackey 2011). According to ethnohistorical information, the Chimú conquered the Jequetepeque Valley, previously controlled by the Sican/Lambayeque Polity, around A.D. 1320 (Conrad 1990; Mackey 2011). The major structures at Fanfan were built at the beginning of the Chimú occupation (Conrad 1990) and the buildings constructed during the Sican/Lambayeque occupation were not reused (Mackey 2011). The structures at Farfan displayed similar features to those in the Chimú capital of Chan Chan, such as large plazas, corridors, storerooms and U-shaped structures (Conrad 1990; Mackey 2011). Architectural features observed at Farfan can be only found in the royal palaces at Chan Chan, suggesting that members of the royal elite resided at the site (Mackey 2011). Later, when the Chimú incorporated the Sican/Lambayeque Polity, they remodeled some of the structures at Tucume, the Sican/Lambayeque center, and built a burial platform, indicating that the Chimú administration at Tucume was composed of Chimú nobility and local elite (Tschauner 2001).

The Chimú built another regional administrative center in the Casma Valley after its incorporation of the Empire around A.D. 1350. The site of Manchan is composed of nine compounds along with storage facilitates. Burial patterns found at Manchan were composed of subterranean tombs which differed from the burial platforms found in the Chimú capital (Mackey and Klymyshyn 1990). Architectural features observed at Manchan suggested that both Chimú and local techniques were used in the construction of the site. In addition, Manchan contained domestic structures in which domestic production activities have been identified. These production activities were conducted on a part-time basis, and it is possible that the Chimú state was directly involved only in textile, *chicha* and metal production (Moore 1981, 1985, 1989). In addition, economic activities found in domestic structures aimed to maintain the household members and not to satisfy the needs of the elite or administrators of the site. Furthermore, the construction of various administrative centers throughout the Casma Valley, the reoccupation and expansion of pre-Chimú sites, and the intensification of agriculture clearly reflect the consolidation of the Chimú authority within the valley (Mackey and Klymyshyn 1990). Furthermore, the only large settlement south of the Casma Valley that is likely associated with the Chimú occupation is the Paramonga fortress in the Fortaleza Valley, considered the southern border of the Chimú Empire (Moore 2006).

Archaeological evidence of the Chimú administration in the provinces suggests that various strategies of incorporation were used in different locations and during different time periods. According to ethnohistorical accounts, the Chimú expansion into the Jequetepeque, previously controlled by the Sican/Lambayeque Polity, was a violent event due to local resistance to the Chimú invasion. The major Chimú administrative center in the Jequetepeque valley was built according to strict Chimú architectural traditions. Based on the absence of Sican/Lambayeque materials, it is inferred that local nobility were excluded from Farfan (Mackey 2011). However, the incorporation of the Sican/Lambayeque Polity and the occupation of the site of Tucume by the Chimú followed a different political strategy. The Chimú occupation at Tucume consisted of remodeling two large Sican/Lambayeque mounds to resemble Chimú palaces, while the other mounds remained intact and continued to be occupied by Sican/Lambayeque elite, suggesting that the two polities shared control of Tucume (Heyerdahl *et al.* 1995). A similar strategy was used at the site of Manchan in the Casma Valley where the Chimú occupation did not change the local political structure or settlement patterns (Conlee *et al.* 2004; Mackey 2011). Control of the Chimú in the northern territories, such as Tumbes, appears to have been indirect and most likely related to commercial exchange that included *Spondylus* shells (Moore 2008). South of Casma, Chimú materials have been documented in the Culebras Valley (Gierz and Przadka 2008; Przadka 2011) and Huarmey Valley (Bonavia 1985; Mackey and Klymyshyn 1990; Tabio 1977; Thompson 1966) without the presence of large structures or administrative centers.

2.4 The Casma Polity

The Casma Polity has received little attention from Andean archaeologists compared to the Sican/Lambayeque and Chimú Polities. Previously, the Casma Polity was described as a ceramic style that developed on the north coast of Peru; however, despite these early claims, some scholars consider Casma a culture (Tello 1956:307); other scholars see Casma as a polity (Conlee *et al*. 2004:211; Mackey 2009:330; Vogel 2003, 2011, 2012, 2016; Wilson 1988, 1995). The origins of the Casma Polity are still unknown, but it is possible that this polity was associated with the decline in the control of the Moche Polity in the southern valleys of the northern coast of Peru. Based on the distribution of the Casma ceramic style, Carol Mackey and Ulana Klymyshyn (1990) proposed that the territory of the Casma Polity covered an area of 300 kilometers, from the Chao Valley in the north to the Huarmey Valley in the south. However, David Wilson (1988) included in the Casma territory the valleys of Viru, Moche and Chicama, while Donald Thompson (1964) also reported evidence of the Casma style in the Fortaleza Valley, situated 83 kilometers south of the Huarmey Valley.

Along with the geographical distribution of the Casma Polity, researchers were also interested in the time period during which this society developed. Some scholars have placed the development of the Casma Polity during the second half of the Middle Horizon (Tello 1956; Pimentel and Paredes 2003; Proulx 1973; Wilson 1988, 1995), while other scholars have placed it in the Early Intermediate Period (Fung and Williams 1977). Absolute dates obtained from the site of El Purgatorio placed the Casma occupation between A.D. 700 and 1400 (Vogel 2011:205, 2012:27, 2018:167; Vogel and Pacifico 2011:361).

This time period was also marked by an increase in population in the coastal valleys and the construction of large settlements (Giersz 2014; Giersz and Przadka 2008; Proulx 1973; Przadka 2011; Wilson 1988, 1995), as well as transportation, communication and trade routes (Giersz and Przadka 2008; Przadka 2011; Vogel 2017; Wilson 1995). The construction of large Casma settlements can be observed in each coastal valley, such as the site of Cerro La Cruz in the Chao

Valley, occupied between A.D. 900 and 1300 (Vogel 2003, 2012), El Purgatorio in the Casma Valley occupied between A.D. 700 and 1400 (Vogel 2012, 2016, 2018) and Ten Ten in the Culebras Valley, occupied at different times from A.D. 980 to 1700 (Przadka 2011).

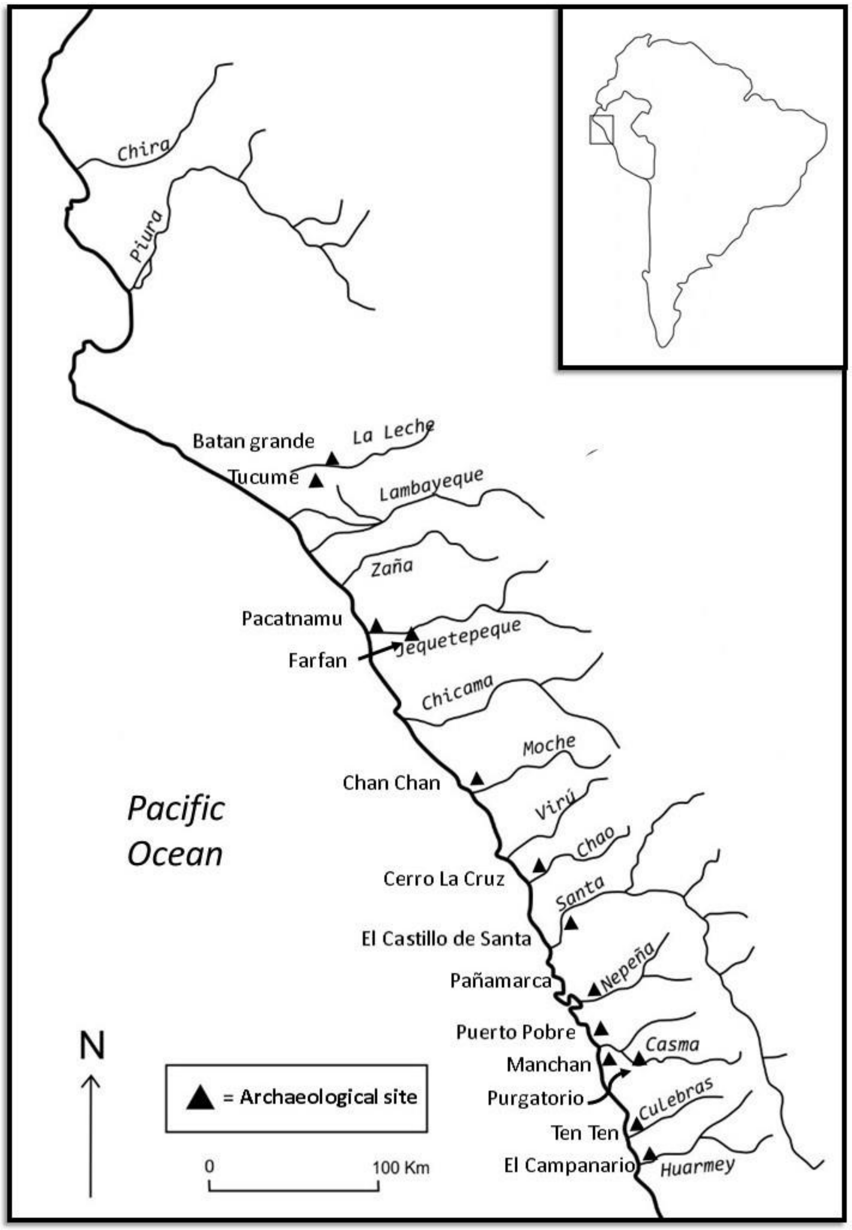

Figure 2.3: Map of archaeological sites on the north coast of Peru

The largest of these settlements is El Purgatorio, which was classified by David Wilson (1995) as a primary site in his four-tier site system (Wilson 1995:204) based on a site's size and function. The size of El Purgatorio has led researchers to interpret the site as the center of a unified Casma polity which extended from the Chao to the Huarmey Valleys (Mackey and Klymyshyn 1990:198; Vogel 2012:35, 2016:46). The architecture at monumental sector of El Purgatorio consisted of large orthogonal compounds along with small platforms adjacent to an enclosed space or plaza, while other sectors at the site consisted in more variable architecture and the domestic areas were composed of irregular structures (Vogel 2011, 2016, 2018; Vogel and Pacifico 2011).

CHAPTER THREE:

THE CASMA MATERIAL CULTURE

3.1 Casma Archaeological Studies in Other Coastal Valley

3.1.1 Culebras Valley

The decline of the Moche style in Culebras is related to Wari influence during the Molino Phase (A.D. 700-850), which shows a change in the settlement pattern. During this period, Moche sites were abandoned or used as cemeteries, and a new architectonic pattern relating to the orthogonal cellular plan appeared (Giersz 2011; Giersz and Przadka 2009). The orthogonal architectural plan consisted of large walls surrounding a rectangular area internally subdivided by compounds containing a series of small rectangular divisions (Isbell 1991:295). The changes in settlement patterns and the presence of public buildings following the new orthogonal plan and the exotic Wari pottery might be indicative of direct control by a foreign authority (Giersz and Przadka 2009:11). This new ceramic style was associated with the local tradition of the *Casma Impreso*, which maintained the old Moche tradition along with cultural influences from the north and south (Giersz 2011:297). Some ceramic vessels showed the *dios de los baculos* (staff god), characteristic of Tiwanaku and Wari iconography. Another component was the decorated vessels of white, orange, and black painting on red slip showing geometric designs. The Molino Phase also showed the introduction of new forms of containers such as the ceremonial cup, or *kero*. Local pottery appeared in the same context as foreign pottery of classic Wari styles.

After a short period of indirect Wari influence in the Culebras Valley, the local population experienced a change in settlement pattern during the Santa Rosa Phase (A.D. 850-1000), which is related to epochs three and four of the Middle Horizon, according to Dorothy Menzel's (1964) chronology. During this phase, the number of settlements increased significantly and were located in the middle area of the valley. One ceremonial site (Playa El Castillo) identified during this phase consisted of mud-brick structures surrounded by stone walls. The ceramic styles associated with this phase is related to *Casma Impreso* as well as the presence of local styles sharing similarities with the Wari-Santa and Wari-Lambayeque style (Giersz and Przadka 2009; Przadka-Giersz 2011).

Table 3.1: Culebras Valley cultural periods (adapted from Przadka-Giersz 2011)

Time	**Cultural Period**	**Culebras Valley**
1500	Late Horizon	Chacuas Jirca Phase
1400	Late Intermediate Period	Ten Ten Phase
1300		
1200		
1100		
1000	Middle Horizon	Santa Rosa Phase
900		

During the Ten Ten Phase (A.D. 1000-1450), the Culebras Valley experienced an increase of settlements and administration sites containing with public architecture, generally built with stone and rare traces of adobe (mud-brick). Some sites also presented *quincha* (wattle and daub) structures related to domestic and production areas. The ceramic style of this phase is associated to the *Casma Inciso*, characterized by fine incised decoration with geometric designs and zoomorphic applications. This local style developed during the last phases of the Middle Horizon, and its distribution was limited to the coast of Peru (Giersz and Przadka 2009; Przadka-Giersz 2011).

One of the most important sites of this period in the Culebras Valley was Ten Ten I. This site contained a monumental complex consisting of a series of adobe platforms with internal subdivisions associated with residential and administrative activities (Przadka-Giersz 2011:340). Early occupation at Ten Ten I was associated with the *quincha* structures along with the local *Casma Inciso* ceramic style related to the decline of the Middle Horizon influence in the Culebras Valley. Later, the *quincha* structures were replaced by adobe structures that were included in public areas used mainly for ceremonial purposes. Radiocarbon dates assign the Ten Ten I site to the Casma culture related to the Late Intermediate Period. While the site of Ten Ten is associated with the Late Intermediate Period, there is no evidence of the Chimú pottery style being directly associated with the Casma pottery style. Major urban growth at Ten Ten occurred during the Inca influence, when production areas and elite residences appeared. Ceramic style associated with these structures are related to the *Casma Inciso*, Chimú-Inca, and Inca polychrome (Przadka and Giersz 2015:138).

The last Pre-Hispanic period in the Culebras Valley is related to the Chacuas Jirca Phase (A.D. 1450-1532) during which the valley was incorporated into the Inca Empire. Most of the sites during this period showed previous occupation of the Ten Ten Phase and architectural use of stone as a main construction material with only public centers containing mud-brick structures. The ceramics during the Chacuas Jirca Phase is associated with the *Casma Inciso* and other decorative styles related to the Peruvian highland and the Inca style (Giersz and Przadka 2009; Przadka-Giersz 2011).

3.1.2 Casma Valley

The Middle Horizon occupation of the Casma Valley was associated with the presence of Casma molded and incised pottery styles (Thompson 1964). One of the large towns that existed during this period was El Purgatorio, which Thompson classified as a "Provincial Elite Center" following the site's classification by Richard Schaedel (1951). The El Purgatorio site was identified by Julio C. Tello (1956) as a city due to its size and the density of its architecture, noting that El Purgatorio was at least half as large as Chan Chan and larger than Pacatnamu. Tello dates El Purgatorio in the Middle Horizon because it included a hillside settlement with portions made of adobe-on-stone construction, typical of this period. The construction at El Purgatorio consisted largely of adobe with stone, wood, cane, and refuse used as fill for platforms, terraces, and the presence of small pyramids (Thompson 1964: 93).

David Wilson assigned two cultural periods in his sequence to the Middle Horizon, the Choloque Period (A.D. 650-900) and the Casma Period (A.D. 900-1100). During the Choloque Period the valley experienced an increase of sites that might be associated with the development of sociopolitical complexity. Wilson hypothesized that the sites during this period were based on size and function representing four hierarchical levels, suggesting an integrated system at the pan-valley level (Wilson 1995:202). In addition, the presence of roads also suggests the existence of an inter-valley relationship. The Casma Period was described as a time of maximum complexity in which 387 sites were identified and classified according to size and function; El Purgatorio was the most important built during this period (Wilson 1995). Also during this period, pottery styles were associated with the *Casma Inciso* style, which were also found in the Nepeña and Santa Valleys.

Recent archaeological research conducted at El Purgatorio revealed that this site was occupied by the Casma polity, and radiocarbon dating results showed that it was established around A.D. 700, coinciding with an increase in population in the Casma Valley. The second increase in population at this site occurred around A.D. 1290 and is associated with the establishment of Sector B south at El Purgatorio (Pacifico 2014:118). The information on the increase of population at the El Purgatorio site comes from David Wilson's survey conducted in the Casma Valley, in which population estimations are based on the number of sites related to each cultural period (Wilson 1995). Furthermore, ceramic evidence from El Purgatorio indicates Casma cultural exchange with other societies such as Lambayeque, Moche, Wari, and Pachacamac (Vogel and Pacifico 2011:366); however, artifacts recovered from the southern area of the site (Sector B) indicate that commoners who resided in the area did not use these foreign objects, since Sector B was occupied after the Middle Horizon (Pacifico 2014:118).

The archaeological research conducted at El Purgatorio divided the site into sectors (Vogel and Pacifico 2011; Vogel 2012). Sector A, consisting of large enclosures with internal structures; Sector B, composed of domestic structures smaller than the structures found in Sector A; Sector C, containing small enclosures and irregular structures; and Sector D, containing the least number of structures and whose architectural patterns are similar to the structures in Sector B (Vogel and Pacifico 2011). Casma ceramic styles consisted of four sub-styles: Casma Incised, Casma Molded, Serpentine Appliqué, and Black-White-Red. In some documents the "Black-White-Red", is sometimes referred to as the "Red-White-Black" or "Rojo-Blanco-Negro" (Vogel 2011; Vogel and Pacifico 2011).

Apart from ceramics as a diagnostic of the Casma Polity presence, Melissa Vogel (2011, 2012) identified architectural plan and settlement patterns as hallmarks of this polity. The Casma architectural pattern was described by Rosa Fung and Carlos Williams during their surveys in Casma and Sechin Valleys (Fung and Williams 1977). They observed that Casma architecture consisted of carefully planned compounds with large exterior walls subdivided by interior rooms, platform complexes, and patios connected by a series of terraces. The development of this architecture showed a change from a theocratic to secular polity; this change was evidenced by the shift away from large ceremonial platforms from the Initial Period and the placement of Casma settlements at strategic and defensive positions (Fung and Williams 1977:138). They also argued that *Casma Inciso* ceramics appeared in the Early Intermediate Period in the Casma Valley as a rebirth of older styles (Fung and Williams 1977:143), such as the Castillo Incised decorative motif identified elsewhere in the Early Intermediate Period and before (Donnan 2009; Millaire 2009).

While Vogel and Pacifico (2011:365) agree with this hypothesis, Vogel adds that a specific architectural form evolved during the Casma Polity, which she called the plaza/platform complex. The plaza/platform complex was a unique Casma modification of the north coastal architectural tradition in which a large platform was built fronting a wide plaza (Vogel 2012:213). Geometric friezes and niches often adorned these plaza platforms and their associated rooms, suggesting they served public and ritual functions (Vogel and Pacifico 2011:379-380). Vogel also noted that ramps and staircases were sometimes associated with these platforms (Vogel 2012:91). Casma Polity architecture also included compounds built of adobe walls on stone foundations (Vogel 2011:209, 2012:40), and ritual and administrative structures included compounds with patios, plaza/platform complexes, adobe friezes, and elite residential sections (Vogel 2011:213, 2012:38).

Settlement patterns of the Casma Polity consisted of sites in the middle of coastal valleys and, in some instances, on hillsides. The distribution of settlements suggested that the Casma Polity intended to control trade routes and protect their subjects from attacks (Pacifico 2014). During the

Late Intermediate Period, El Purgatorio experienced an increase in residential structures, which is associated with the expansion to the Chimú Empire. Later, with the construction of the regional Chimú site at Manchan (A.D. 1350-1400), El Purgatorio's residential areas were abandoned, and it is probable that the site's inhabitants migrated to other settlements in the area (Pacifico 2014:131).

David Pacifico (2014) excavated a domestic area at El Purgatorio where all structures included foundations of unworked stones, usually without mortar, that were placed directly above the bedrock. The domestic areas excavated did not contain evidence of superimposed structures, remodeling or adjacent structures, indicating that these domestic areas were constructed during a single period (Pacifico 2014). The primary function of the structures was domestic, and included diverse activities, including extra-household production and consumption. Furthermore, the domestic structures were classified into various architectural styles that could have been related to social status among non-elite groups at El Campanario. The variation in households were related to the presence of specific construction materials and floor plans, such as large rooms sometimes built with mud-brick along with an orthogonal plan associated with high-status urban commoners (Pacifico 2014:238). Low-status urban commoner households, on the other hand, consisted of small, irregular structures built of stones and *quincha*. The storage units identified in Sector B are indicative of the accumulation of goods that occurred at the neighborhood (centralized) and household (dispersed) levels. Three different types of storage rooms were identified at Sector B: the single closet-like storage room, the semi-orthogonal storage room, and a central storage depot (Pacifico 2014:318).

The diversity and distribution of materials found within El Purgatorio's Sector B indicated that cooking, food processing, ceramic production, and textile manufacture were common activities for the inhabitants of this sector. According to Pacifico (2014), some residents engaged in mollusk collection and shared a common diet based on marine resources, maize, *chicha* (maize beer), and cultivated fruits. Besides common production activities and similar foods, residents in Sector B produced and used ceramics with simple symbols of local identity in their daily life (Pacifico 2014:297). Maize processing was one of the most important activities in Sector B. Pacifico (2014) identified three scales of maize processing: a) domestic production for domestic use; b) industrial production for extra-domestic/communal use; and c) domestic production for extra-domestic communal use. Industrial processing of maize was determined based on the number of *batanes* (gridding stones) found in each domestic structure. In addition, the abundance of maize cobs indicates that the processing of maize was an important activity in Sector B. *Chicha* was the principal commodity in a redistributive economy that tied together households of different statuses, created community and hierarchy through consumption rituals, and politicized the houses and neighborhood life of commoners at El Purgatorio during intensive processing sessions (Pacifico 2014: 299). Household economies are politicized because they can rarely subsist in isolation in which households are connected to each other for subsistence purposes that create social bonds (Pacifico 2014: 270).

Ritual activities performed within the households involved interred hair bundles used as offerings associated with construction/abandonment events or life-cycle rituals (Pacifico 2014; Vogel 2003). This household ritual was widely shared by the residents of Sector B, suggesting an ideological connection among the residents within this sector (Pacifico 2014).

The last period in Wilson's scheme is called the Manchan Period (A.D. 1100 – 1532) and includes the Chimú and Inca periods. During this period, distribution of the sites was usually oriented towards lower areas within the valley, and after the incorporation of the Casma Valley into the Inca Empire, the population continued to manufacture pottery in the Chimú style containing patterns observed at other Late Horizon sites (Wilson 1995).

The Chimú occupation of the Casma Valley started around A.D. 1305 and has been identified through architecture and artifact remains. Chimú settlements in this valley included ten administrative centers and five villages whose architectural features have been compared to similar remains from the Chimú capital of Chan Chan; Chimú ceramic (fine and course wares) were found in both administrative centers and villages (Mackey and Klymyshyn 1990). The main difference between administrative centers and villages is that the former contained mud-brick or stone compounds with internal divisions consisting of rooms and courts. Based on the number of compounds, three ranks of administrative centers have been identified in the Casma Valley. The Manchan site is considered a secondary or regional center containing nine compounds. Two sites containing seven compounds served as tertiary centers and another seven sites containing one or two compounds were classified as quaternary centers (Mackey and Klymyshyn 1990:202). The only site with storage facilities in the Casma Valley was Manchan, the regional center for tribute collections, shipment of goods to the capital, and redistribution of resources. Burial patterns at Manchan differed from those in the capital that separated compounds containing subterranean tombs. The construction of administrative centers throughout the Casma Valley, the reoccupation and expansion of pre-Chimú sites, and the intensification of agriculture clearly reflect the consolidation of the Chimú authority within the valley.

During the Late Intermediate Period, the Manchan site operated as a provincial administrative center for the Chimú Empire. Jerry Moore (1981, 1985) conducted archaeological research at this site, specifically focusing on lower economic classes, who were the basic source of labor and production for the Chimú Empire (Moore 1981:115). Architectural characteristics of the site shared similarities with the Chimú capital of Chan Chan, such as adobe compounds that contained courts and storage rooms, residential adobe structures defined as small, irregular agglutinated rooms (SIAR) where high-status affluent groups lived, and small, irregular rooms built of cane. The main purpose of the research conducted at Manchan was to excavate the cane structures defined as *barrios* (Moore 1985). Organization of labor, according to Moore, consisted of short-term corvee labor obligations for the inhabitants of the barrio groups, since no large-scale construction projects were present in the Casma Valley during Chimú rule with the exception of the Manchan site itself (Moore 1985). It appears that in the *barrio* groups, domestic labor was diverted by the state to public goals, but not on a full-time basis. Production activity identified within that *barrio* groups was diverse, including shellfish collection, fishing, agriculture, stone tool manufacturing, carving of wooden items, textile production, *chicha* production, and metallurgy. Analysis of shellfish diversity in each household showed that residents in the *barrio* groups obtained their shellfish in the same manner, and it is possible that they procured their own mollusks (Moore 1985:268), instead of trading for them with shell-fishing communities living on the shoreline. In the case of fishing, the presence of fish hooks and nets in some households indicated that some residents directly participated in fishing activities. The absence of agricultural tools within the barrio groups suggests that the residents did not participate in farming activities; however, they did consume agricultural products. The manufacture of stone tools by the barrio groups was based on flake production from basalt cobbles obtained from the Casma River. In addition, production of wooden artifacts was an important economic activity for the Chimú Empire, and artifacts recovered within the barrio groups included spindles, weaving beaters, and carved wooden statues. These findings suggest that woodworking was an important economic activity among the lower classes at Manchan (Moore 1985:281). Distribution of spindles and whorls indicated that spinning was an important activity in the household. The presence of cotton bolls and seeds suggest that the cotton was transported to the household in a crude stage (Moore 1985:287). *Chicha* production was an important activity within the barrio groups. While *chicha* can be made from algarrobo pods, molle berries and peanuts, archaeological evidence showed that at Manchan the *barrio* groups produced *chicha* with maize. *Chicha* production was found in most residential groups where some households may have engaged in certain levels of intensification of production while others made *chicha* for domestic consumption. Evidence of metallurgy is related to the presence of copper ore and grinding implements, and the association of copper splatter and a blow tube tip on the hearth in one household suggested the presence of smelting. There is no evidence of casting; instead, the copper seems to have been worked by hammering and possibly by annealing (Moore 1985:309).

Research conducted in barrio groups at Manchan provided insight into the economic activities among lower-class groups, and illustrates that the Chimú state may have been directly involved in textile production, *chicha* making, and copper metallurgy. Other economic activities identified within barrio groups do not show evidence of direct control of the Chimú state over those activities (Moore 1985). In the case of agricultural products, the absence of tools within barrio groups suggested that the Chimú state provided residents with food products. Patterns of production in these groups suggest that the state's involvement in lower-class economy was different in Manchan than in the Chimú capital of Chan Chan. Apparently the process of economic integration by the Chimú Empire was different in the provinces from that in the capital (Moore 1985:318).

Consumption items found within the barrio groups at Manchan indicated that they were available within the Casma Valley, and the only non-local items found were fragments of *spondylus* shell and *mishpingo* seeds. According to Moore, the presence of local items is an indication that the Chimú state was not directly involved in the household consumption pattern. It is clear that lower classes at Manchan participated in different types of craft specialization in favor of the state. However, evidence in Manchan suggests that the Chimú state did not support lower class households by providing them with exotic items (Moore 1985:364). Economic activities conducted were not performed to satisfy state or elite needs; instead, they were aimed at maintaining the residents of the barrio groups.

In 2016 as part of the project to expand the Panamerican highway a partial archaeological excavation was conducted at the site of Manchan. Based on this archaeological research Manchan was found to contain four phases of occupation. The first phase consisted of a series of individual structures for storage which were built using stones and adobe bricks, and most of them contain Casma Molded and Casma Incised ceramic styles. The second phase contained *quincha* (daub and wattle) structures associated with kilns containing various ash layers as a result of constant use for pottery production. The fuel used were possibly plants and cuy (*guinea pig*) coprolites. The material found in the *quincha* structure suggests domestic activities and the ceramic associated is the Casma Incised style. The third phase included the construction of adobe walls which surrounded a large enclosure which served for public events. While the *quincha* structures continue in used during this phase the ceramic found associated to the adobe walls belong to the Casma Incise style and the Chimú style. The last phase is composed by a quadrangular plaza associated to an elevated adobe platform. It is possible that this phase is related to the Inca occupation of the site, however, there were very little Inca ceramic styles and there was only evidence of Inca provincial styles. While this last phase might indicate the Inca presence in Manchan, the Casma and Chimú styles continued to be manufactured at this site (Saman Alvarado and Horna Galvez 2018).

Klaus Koschmieder conducted archaeological research at the Chimú site of Puerto Pobre, located on the right bank of the Casma Valley. The site was divided in two distinct sectors. Sector 1, which is the Casma settlement, contained *quincha* structures, hearths, small mud-brick structures used as *cuyeros* (enclosure for raising guinea pigs), storerooms, and funerary structures (Koschmieder 2011:415). Domestic activities such as cooking, *chicha* preparation, storing maize and beans along with evidence of craft production, such as textile production of llama wool, metal work, and stone objects was also identified in Sector 1 (Koschmieder and Centeno 1996). Sector 2 is defined as a Chimú administrative site composed of a quadrangular structure containing patios, small rooms and corridors (Koschmieder 2011:418).

Radiocarbon dates suggest that the site was occupied for a short period of time during the end of the Chimú occupation in the valley, between the end of the fifteenth century and the beginning of the sixteenth century. Evidence obtained at the site also indicated that the local population of Puerto Pobre was relocated by the Chimú state as part of its administrative control in the valley. The presence of prestige items within the *quincha* structures, such as figurines, metals, and stirrup spout bottles, suggests the existence of differences in status among the households. Sector 2 at Puerto Pobre does not contain evidence of domestic activities, and the architectonic features (ramps, platforms and niches) are related to administrative and ceremonial functions (Koschmieder and Centeno 1996).

Another site investigated in the Casma Valley is Quebrada of Santa Cristina, a settlement of agricultural workers established and maintained by the Chimú Empire (Moore 1988). This site contained 284 cane structures that served as residences, venues for public activities, and communal kitchens. Inhabitants' consumption at this site was interpreted as exclusively maize and beans, based on the absence of remains of fruits or vegetables. The presence of agricultural tools and the proximity of raised fields suggests that the inhabitants of Quebrada of Santa Cristina were directly involved in agricultural production. The Chimú occupation of the Casma Valley included the construction of agricultural communities supported by the state as a strategy for hegemonic expansion, in which the Chimú state was involved (Moore 1988).

3.1.3 Nepeña Valley

The Early Intermediate Period occupation of this valley is associated with the Moche Culture at the site of Pañamarca between A.D. 650 and 800 (Trever 2017). In addition, the presence of Recuay material culture was reported by Donald Proulx, who proposed that Moche Culture occupied the lower and middle areas of the valley, while Recuay Culture occupied the upper area of the valley (Proulx 1968, 1973). Furthermore, the distribution of Moche and Recuay sites led Proulx to believe that a cultural territoriality existed in the Nepeña Valley during this period (Proulx 1982). However, the site of Huambacho, which was originally assigned to a Moche occupation by Proulx, is actually an Early Horizon elite center containing intrusive Moche burial sites (Chicoine 2011:527). Other ceramics identified at Huambacho included Gallinazo, Casma press-molded, Casma Incised, and Chimú blackware (Chicoine 2011:529). Furthermore, Proulx placed the site of Huancarpon as part of the Recuay occupation in the valley, but most of the Recuay ceramics was found on the surface (Proulx 1982:86) and the site is related to a Late Early Horizon occupation (Dagget 1987:77).

Another Moche site investigated in the Nepeña Valley is Cerro Castillo which is located near Pañamarca where the community residing at the site was influenced by Moche culture. The evidence of pottery production indicated that Cerro Castillo inhabitants used Moche artistic representation to express a new cultural identity while producing and consuming local ceramic vessels (Rengifo 2016:386).

After the end of the Moche occupation in the Nepeña Valley, Casma molded ceramics appeared at Panamarca, which indicates that local population reused this Moche site (Trever 2017:311). In addition, Casma ceramic decoration was also found at the site Cerro Castillo associated with architecture and funerary contexts (Rengifo 2014:144). Along with Moche and Casma ceramics, other ceramic styles were present at Cerro Castillo during the Middle Horizon, such as Wari and Gallinazo (Rengifo 2014:196).

Initially, Casma ceramic decoration was defined as Wari Norteño by Donald Proulx, since it was believed that Casma ceramics were stylistically related to the Wari culture. In addition, Proulx argued that the Nepeña Valley during the Middle Horizon experienced an increase in population where many sites were re-occupied by Wari-influenced populations (Proulx 1968). However, population estimates conducted by Hugo Ikehara in the middle Nepeña Valley suggests a decline in population during the Early Intermediate Period with a minor increase in population in the subsequent periods (Ikehara 2015:86).

Between 1980 and 1981, Richard and Cheryl Daggett conducted a survey in the mid- and upper portions of the Nepeña Valley in order to study the distribution of the Casma Incised pottery style (*Casma Inciso*). Besides the identification of *Casma Inciso* style, Daggett (1983) defined Serpentine Appliqué as a second style of Casma pottery style. This pottery style included jars that usually were ovoid shaped, along with three categories of rim (flare, lipped-flare, and short vertical), and, like *Casma Inciso*, was a utilitarian ware (Daggett 1983:219). Serpentine Appliqué pottery was found along with a pottery associated with the Early Chimú Period (800-1000) and included Epoch 4 of the Middle Horizon (Daggett 1983). During Daggett's survey, sixteen sites were found to contain the Serpentine Appliqué style associated with Early Chimú pottery, while ninety-seven sites showed the presence of *Casma Inciso* pottery related to Middle Chimú blackware. There was a significant change in the settlement pattern during these two periods, whereby the sites that contained the Serpentine Appliqué were located in the lower and middle areas of the Nepeña Valley, while the *Casma Inciso* sites were located in the upper valley (Daggett 1983). Most of the sites located in the upper valley contained defensive structures such as stone walls and ditches, indicating that this area was under considerable stress during the Middle Chimú Period.

Chimú sites within the Nepeña Valley were located in the lower and middle areas of the valley. Typical construction material at each site was rectangular mud-brick; however, a few sites used stone. One of the most important sites in this valley during Chimú period was Huacatambo, which functioned as an administrative center (Proulx 1973). In addition, Chimú intrusive burials were also found at Early Horizon sites such as Huambacho (Chicoine 2011:531) and Chimú-Inca burials at Samanco (Helmer 2014:72).

3.1.4 Santa Valley

Information on human occupation of this valley was initially reported by Christopher Donnan (1973) and David Wilson (1988) who conducted systematic surveys there. The survey conducted by Christopher Donnan aimed to observe the Moche occupation in the Santa Valley. Some sites recorded in the valley had various occupation like the Cenicero site (PV28-97) which contained Moche occupation as well as Middle Horizon and Late Intermediate ceramic styles form looted burials. Besides the presence of early Moche ceramics there was also a single vessel that contain Moche phase V ceramic along with Wari decoration (Donnan 1973:23). In addition, four polychrome jars, two blackware modeled jars and two black ware cups were found at the Cenicero site (Donnan 1973: 135, plate 7). David Wilson (1988) divided the Middle Horizon into two distinctive periods. The first period was Early Tanguche, which included residential sites and cemeteries, but few sites containing public architecture. The number of residential sites increased compared to the previous Early Intermediate Period occupation. However, population density in the Early Tanguche remained the same as in the previous period. Large structures classified as local centers were areas used for multiple purposes, including elite residences, possible storage units, llama corrals and, at some sites, plazas for public events (Wilson 1988:234-238). The second period within the Middle Horizon was the Late Tanguche, characterized by a significant decline in the number of archaeological sites, showing a decrease in population compared to Early Tanguche. In addition, there was no evidence of large public settlements, and some sites showed the presence of defensive architecture. Ceramic vessels associated with this period were decorated with raised circles and dots (Casma Incised), and, according to Wilson, this style was confined to the Santa, Nepeña and Casma areas during the Late Tanguche Period (Wilson 1988:270).

The Early Tambo Real in the Wilson (1988) chronology is related to the Late Intermediate Period. Early Tambo Real does not show significant changes in the number of sites compared to the previous period. The presence of defensive sites and the absence of a public-ceremonial center is a primary characteristic of this period. However, there was no significant variation in the number of sites as the valley experienced a decline in population during the Early Tambo Real. Ceramic associated with this period is usually redware and blackware sherds along with the absence of painted pottery.

The last period in the Wilson (1988) sequence of the Late Tambo Real is related to the Late Horizon. The number of sites increased during this period and the population increased in relation to the previous period. The settlement pattern changed due to the imposition of the Chimú state system in the Santa Valley. The main centers of this period were strategically located near highway systems probably as the result of incorporation into Chimú state policy or new socioeconomic forces that intensified the use of intervalley roads (Wilson 1988: 293).

Later, archaeological research conducted by the University of Montreal was oriented to observing the Moche occupation in the Santa Valley. One of the sites excavated was El Castillo, occupied by various cultural groups including Gallinazo, Moche and Tanguche, a local Middle Horizon culture (Chapdelaine 2008). The excavation of a small compound at El Castillo recovered painted and press molded vessels dated around the end of the Middle Horizon (Chapdelaine 2010: 226). The excavation of a Tanguche burial at the site of Huaca China showed ceramics that included press-molded decoration, tricolor painted bowls, and blackware tripod plates, perhaps indicating various cultural influences in the Santa Valley during the Middle Horizon (Chapdelaine et al. 2004).

Early Tanguche ceramics in the Santa Valley consisted of Black-White-Red, press-molded decoration, and the appliqué technique. While redware ceramic was very common during the Tanguche period, blackware ceramic became extremely important during this period (Belisle 2008). Radiocarbon dates also place the Early Tanguche around the end of the Middle Horizon and the beginning of the Late Intermediate Period.

3.1.5 Chao Valley

The archaeological excavation of late period sites is minimal in this valley and most of the information of late site is the result of surveys conducted in the area. The study conducted for Mercedes Cardenas (1996) assigned 15 sites to the Middle Horizon, 35 to the Late Intermediate Period and 4 to the Late Period. In addition, the ceramic recovered in most sites were identified as local Middle Horizon styles and as Chimú styles. In 2003, Melissa Vogel conducted an archaeological excavation for her dissertation research at the site of Cerro la Cruz. This site was built at the end of the Middle Horizon and marked the occupation of the Casma polity in the Chao Valley (Vogel 2003, 2012). The site is composed of a series of compounds where domestic and productive activities were found. It is possible that the Casma polity were securing the border line in the Chao Valley since around the same the Chimú polity was developing in the Moche Valley. Later the Chimú successfully incorporated the Chao Valley into their political and economic system.

Another important site excavated in this valley is Santa Rita B where Jonathan Kent (2001) identified the presence of camelids corrals based on the extensive coprolites layers at the site and suggests that camelids were maintained on the site as part of husbandry activities. This site has a long cultural history and was occupied since the Early Horizon until the Colonial-Chimú period. While Santa Rita B was occupied before and after the Chimú incorporation of the Chao Valley, there is no evidence of fortification at the site like Cerro La Cruz site, nor presence of Casma material culture (Busch 2009). The structures found at the site consisted mostly of uncut stones and clay, and in some instances, they used mud bricks. Besides the corrals areas of domestic activities also were excavated which suggest the consumption of coastal and highland products

(Kent et al. 2016). In addition, isotopes analysis of human remains at the site revealed the consumption of C4 plants which suggests that maize grew locally (Bethard et al. 2008).

3.2 The Casma Ceramics

Ceramics are the most common type of artifact that archaeologists find and are often used to interpret past human behavior. Ceramic attributes including style have been used as chronological markers in the Andean region and elsewhere. However, style is a difficult and complex concept since is not restricted solely to attributes on pottery. James Sackett argues that style and function are complementary in which stylistic choices are assumed by functional forms. Furthermore, stylistic choices are culturally transmitted depending upon the intensity of social relations that could have been the result of ethnically similar groups or transmitted through social networks (Sackett 1977: 371). Styles can be expressed at different ethnic levels, from individual kin groups to large cultural complexes that occupied significant areas in space and time (Sackett 1990:33). According to Polly Wiessner, there are various ways through which persons can project many aspects of their identities to others, such as dialect, nonverbal behavior, and style. Style is defined as a formal variation in material culture that transmits information about personal and social identity (Wiessner 1983:256).

Ian Hodder (1990) argued that while style has various social functions, including group membership, it cannot consist of those functions. In addition, styles are not choices made solely for functional reasons, and while styles involve choices, choices have styles (Hodder 1990:45). Style is defined by Ian Hodder as the referral of an individual event to a general way of doing. According to Brenda Bowser, style is more than a way of doing, a set of rules, a simple choice among culturally constrained alternatives, or a means of communicating social identity. It is a set of rules to be manipulated, and a set of choices to be made in the negotiation of social identity (Bowser 2000:242).

Gabriel Ramon's study of pottery production on the north coast of Peru observed the importance of understanding technical style, which is the particular method used to manufacture ceramic objects in a specific geographical unit. Ramon argues that the definition of technical style, which refers to the complete manufacturing process, can expand the traditional meaning of style, which refers to external features. In addition, technical style is related to toolkits which have limited geographical distribution, in which each type of toolkit corresponds to a technical style (Ramon 2008:70-71).

During the expedition to the Maranon in 1939, Julio C. Tello conducted a survey in the Casma Valley and identified various ceramics groups associated to what he called "Horizonte Medio" (Middle Horizon) and "Horizonte Superior" (Late Intermediate Period and Late Horizon). Tello was the first to use the term "Casma Style" and besides the presence of Chimú ceramics, he observed blackware stamped ceramic called Santa, redware stamped called Paramonga (Casma press-molded), and incised Casma. The presence of various ceramic styles in the Horizonte Superior and the lack of information about later cultural periods at that time led Tello to propose two alternatives in which each ceramic styles might represent a culture and therefore were a group of cultures interacting together, or that each ceramic style was a single element of a single culture (Tello 1956:305-307).

Later, Donald Collier (1962) classified the Casma ceramic decoration into two groups, Casma Molded (or press-molded) and Casma Incised (Figure 3.1). Casma Molded was defined as redware pottery of globular and flask-shaped bottles with tall necks or face collars, with nubbin handles on the shoulder. The design on the vessels consisted of molded designs of low relief depicting animals and personages wearing elaborate headdresses and costumes. The Casma Incised is also a redware pottery consisting mostly of *ollas* with strap handles and adorned with decorations with the following features: incising, punctuations, stamping, punctuations zoned with incising, dentate stamping, rocker dentate stamping, stamped circles and dots, appliqué bumps, welts and serpentine ridges with punctuations and small zoomorphic adornos (adornments), usually in form of birds, applied to rims, shoulders and handles (Collier 1962:416).

Figure 3.1: Ceramic Decoration found at El Campanario site: a) Press-Molded and b) Incised.

The survey conducted in the Nepeña Valley by Donald Proulx identified the presence of Casma pottery (called by Proulx "Huari Norteno B"). Two basic forms were found; fancy decorated ware, often painted in two or three colors but included press molded and modeled pieces, as well as utilitarian wares, unpainted and usually decorated with raised circle and dot decoration, incised lines, appliqué, or press-molded. The most predominant vessel shapes are globular or canteen-shaped jars, face-necked jars, flaring bowls, pitchers, and an occasional double spout and bridge bottle. Decoration on the jars is confined to the upper one-third to one-half of the body of the vessel. The bulk of the designs are geometric; only the face-neck jars have anything approaching naturalism. A second major shape category of fancy vessels is flaring bowls. These are small in size with flat bottoms and low flaring sides. Although they are often decorated on the exteriors, interior painting is characteristic of the period.

Another common form of exterior decoration is press-molded, an easy task since all of these bowls were mold-made. The motifs include condors and condor heads, scroll designs and birds, along with other themes. When interior decoration occurs, it is usually in two forms: semi-circular geometric elements drawn around the rim bowl, or groups of vertical lines running from the rim to the bottom of the pot. The press molding which is found on the flaring bowls, as well as on utilitarian neck jars, was widespread on the northern coast at this time (Proulx 1973: 59-60).

Figure 3.2: Serpentine Applique found at El Campanario site

In 1983, Cheryl Daggett, in her study of the Casma Incise ceramics in Nepeña Valley, analyzed over 200 pottery sherds. In this study, she identified some common pottery rim types such as the flare rim, comprising 38% of the total sample. The second common rim type is the lipped-flared rim, comprising 27% of the sample. Other rim types include the incurving rim and the high-collar rim. Daggett also observed that the Casma Incise is an oxidized redware of which the basic shape is a jar decorated with punctuation, incision, stamping, combing, appliqué and modeling (Daggett 1983:217). In addition, Daggett identified a separate style of the Casma Incise called Serpentine Appliqué (Figure 3.2), a utilitarian ware of a reddish brown to brown color. This style consisted of linear appliqué of clay in a crescent or squiggle shape upon which small circles were stamped (Daggett 1983:219).

The presence of Casma ceramics was also reported in the Santa Valley during an archeological survey conducted between 1979 and 1980 by David Wilson. He named the Casma style in the Santa Valley as Black-White-Red state based on the decoration used in the ceramic. In this survey Wilson also developed a chronology for the valley based mostly on stylistic comparison of ceramics with other valleys on the northern coast of Peru. Using this relative chronology, Wilson placed the Casma Molded and Black-White-Red ceramics in the period Early Tanguche (A.D. 650-900), while Casma Incise was placed in the Late Tanguche (A.D. 900-1150). Early Tanguche Period ceramic styles include straight bowls with out-slanted walls or vertical incurving walls; large ovoid jars, large globular jars with everted or flared rims; human effigies, neck vessels, black-and-white redware, and plain and decorated annular-base bowls. Ceramics of the Early Tanguche Period also included polychrome vessels and exotics sherds affiliated with the Cajamarca style from the north and central coast of Peru. The ceramic styles included in the Late Tanguche Period consisted of plain redware bowls; sometimes the inside surface was covered with heavily incised, crosshatched lines. Jars of this period were globular and decorated with the circle-and-dot design, appliqué with incise around the exterior of the rim, and press-molded zoned stippled decoration. Some jars had press-molded decoration and a twisted handle on one side of the vessel (Wilson 1988).

The excavations conducted at the site of Cerro la Cruz have permitted descriptions of Casma ceramics. The vessel forms most commonly found at Cerro la Cruz are *ollas*, jars, bowls, stirrup-spout bottles, *tinajas* and graters. Decoration on the vessel surfaces include serpents and lizards. Serpents are depicted forming an S shape or coiled into circles on the body of the vessel, while lizards are usually splayed out over the shoulder of the vessel. These appliqués are often found in blackware pottery. The Casma ceramics at Cerro la Cruz also incorporated elements of the Chimú iconography such as the front-facing god. There are also vessels with tiny stipples similar to Early Chimú that local potters replaced with birds, fish, serpents and *Spondylus* shells. In addition, one ceramic *kero* was found alongside decorated *tinajas*, indicating the influence of various coastal and highland traditions such as Chimú and Wari styles (Vogel 2003: 237). Cathy Costin suggests that hybridity can be a negotiated response to changing socio-political relations in which all parties have, although not in equal ways, some agency in generating the outcome, and hybridization is a balancing strategic act that creates new identities for some or all parties in contact (Costin 2016:321). Among the ceramic analyzed at Cerro la Cruz were ceramic molds with press-molded decoration, while other ceramic sherds show examples of makers' marks (Vogel 2003, 2012).

Other studies of Casma ceramics were conducted at the site of Cerro Sechin in the Casma Valley by Maria Bastiand (2006). The ceramic material used in this study was obtained from the excavation conducted in 1974 by Lorenzo Samaniego. Based on the analysis of 2553 sherds, Bastiand defined ten ceramic styles within the Casma style: the Impreso Inciso Estampado (Press-Incise-Stamping) style constitutes 68% of the total sample. The color of the vessels are orange and light brown, the most common forms being *ollas*, jars, bowls and *tinajas* (Bastiand 2006:110). The Casma style at the site of Sechin was influenced by the Chimú style; however, there is no evidence of the decline in the manufacture of Casma ceramics, which continued until the Inca period (Bastiand 2016).

Casma ceramics were found at the site of Puerto Pobre in the Casma Valley. They include many with incised decoration, application, press circles and white painting on the red pottery surface, along with braid handles and the Casma bird placed on the surface of the ollas (Koschmieder 2011:418). The combination of Casma and Chimú styles, according to Koschmieder, occurred during the last moments of the Puerto Pobre occupation, and ceramic decoration was related to applications, which included strips and stylized snakes.

At the site of El Purgatorio Melissa Vogel classified Casma ceramics into three styles; Casma Incised (including serpentine appliqué), Casma Molded, and Black-White-Red. The vessel forms at El Purgatorio consisted of ollas, jars, bowls, face-neck jars and molded designs of people and animals. Casma pottery decoration included incise circles, circles surrounding dots in rows, or "rope" design, around the neck of the vessels. Other elements included small handles on the neck or shoulders of jars and ollas. These handles were tubular, flattened, twisted like rope, or serrated like a rooster comb. Animal appliqués (birds, felines, lizards, frogs, and turtles) were sometimes added to the shoulder or body of the vessels, as were low pedestal bases on some jars and pedestal or tripod bases on some bowls. Molded designs were often simple and geometric (raised lines, dots, triangles, and spirals), but also included some zoomorphic and anthropomorphic figures. In addition, among the ceramic molds found at El Purgatorio, some showed the circle-and-dot motif, often associated with the Casma Incise (Vogel 2016: 64-66). According to Vogel, Casma vessels sometimes had a combination of various decorative techniques on the same ceramic vessel, such as Casma Incise and Molded or the Black-White-Red over Casma Molded designs (Vogel 2016: 69). In addition, excavation conducted in Sector B (domestic areas) provided information about the vessel forms used within domestic structures. Vessel types included bowls, jars, short-neck ollas and neckless *ollas*, *tinajas*, bottles, stirrup spout vessels, *trompitas* (miniature vessels) and whistles. The most common decoration on the pottery was Casma Incise, followed by the Casma Molded, Black-White-Red, and serpentine appliqué (Pacifico 2011: 234-236).

The archaeological project conducted in the Culebras Valley by the University of Varsovia and Catholic University of Peru provided information about settlement patterns and the Casma ceramic style. Casma Molded contained geometric designs and complex themes which might have derived from the Moche Iconography. In addition, the presence of face neck jars, polychrome decoration and *kero* cups might indicate foreign influence in local Casma ceramic decoration. The Casma Incise is composed of the circle-and-dot design and zoomorphic adornos such as birds, snakes or moneys (Giersz and Prządka 2008; Prządka 2011).

Previous studies in the Huarmey Valley also identified the presence of Casma style, although it was based primarily on surface collections. Thompson (1964) identified mold-made ceramics along with what he called "Huarmey Incised", defined as rococo incised and punctuated pottery (Thompson 1964:545). Research conducted by Ernesto Tabio (1977) in Huarmey also identified the presence of Casma ceramics, which he called "Estilo Huarmey Impreso" (Huarmey Pressed Style) which is redware manufactured using molds. The other style identified by Tabio was Estilo Huarmey Inciso (Huarmey Incised) which was redware showing the same characteristics as Casma Incised, described in 1964 by Donald Collier.

Pottery analysis conducted at the site of El Campanario by Enrique Zavaleta and Rocio Sanchez (2013) was based on a ceramic surface collection. In this study, they defined nine vessel forms including *ollas*, *vasos*, *tinajas, tazones*, *cantaros*, *cuencos*, *escudillas, platos*, *tinajas* and *anforas*. In addition, four ceramic styles were defined: Campanario Inciso, Campanario Inciso con Aplicaciones, Campanario Moldeado and Campanario Pintado (Zavaleta and Sanchez 2013).

3.3 Chronology of the Casma Style

Most of the chronological affiliation of the Casma pottery style has been based on stylistic comparisons to other ceramic styles from northern coastal valleys. Most of these associations place the beginning of the Casma style in the second half of the Middle Horizon (Tello 1956; Wilson 1988). Rosa Fung and Carlos Williams (1977) proposed that the development of Casma style occurred between A.D. 200 and 1470, and was contemporary to the Moche, Chimú and Inka. Few studies of Casma pottery style have correlated the presence of distinctive Casma ceramic styles with absolute dates. Donald Proulx (1973) proposed a chronology that associated Casma style with the Middle Chimú period, and Cheryl Daggett (1983), based on the ceramic analysis of the Casma Incise and Casma Serpentine Appliqué conducted in the Nepeña Valley, associated these Casma styles with the Early and Middle Chimú periods. Excavations conducted at the site of Cerro la Cruz in the Chao Valley where Casma pottery style was found have demonstrated, based on radiocarbon dates, that was occupied around A.D. 900 (Vogel 2003, 2012). In the Santa Valley, Casma style, according to Wilson (1988), appeared during the Early Tanguche Period (A.D. 650-900). However, excavations conducted at the site of El Castillo have been able to date an Early Tanguche context between A.D. 975 and 1190, which also indicates that the presence of polychrome pottery in the Santa Valley appeared later than previously thought (Belisle 2008:26). In the Casma Valley, archaeological research at the site of El Purgatorio has provided absolute dates of the Casma occupation and ceramic style. The earliest occupation at El Purgatorio was around A.D. 700 and continued until A.D. 1400 (Vogel 2016; Vogel and Pacifico 2011) when the Chimú Polity incorporated the Casma Valley into their socio-political structure (Table 3.2).

In the Culebras Valley, the presence of the Casma style is related to the Molino Phase (A.D. 700-850); in this phase, the most representative style is Casma Molded. During the Santa

Rosa Phase (A.D. 850-1000), there was a decrease in the manufacturing techniques of the Casma Molded and, by the Ten Ten Phase (A.D. 1000-1450), the most common ceramic style was Casma Incise, which included circle-and-dot decoration and the application of zoomorphic figures (Giersz and Prządka 2008; Prządka 2011). Unfortunately, the lack of radiocarbon dates at most sites which contain Casma style pottery made it difficult to have a rigorous chronology marking the development of this unique ceramic style on the northern coast of Peru. During archaeological investigations conducted in the Chao Valley, Victor Pimentel and Maria Paredes (2003) reported the presence of Casma ceramic style in association with the Moche Phase V and the early Chimú period. In addition, Maria Bastiand studied a burial at Cerro Sechin containing three ceramic vessels associated with the Casma style, Casma-Chimú and Chimú-Inca (Bastiand 2006:109). In the Casma Valley, David Wilson (1995) divided the Casma occupation into two periods: the Choloque Period (A.D. 650-900), associated with the Black-White-Red style, along with the increase of sites that can be associated with the development of socio-political complexity, and the Casma Period (A.D. 900-1100), described as a time of maximum complexity and associated with Casma Incised.

Archaeological research conducted in the Culebras Valley by Giersz and Przadka (2009) established the chronology of this valley based on stratigraphic correlations. In this chronology, Casma Molded appeared in the Molino Phase (A.D. 700-850) and the iconography is related to the Moche, Tiwanaku and Wari styles. The next period in the Culebras Valley is Ten Ten (A.D.1000-1450), characterized by the development of a new political entity associated with the Casma Incise style, which included geometric designs (circles and dots) and zoomorphic applications. While the Casma Incised style in the Culebras Valley continued until the Inka occupation, in the Casma

Valley this style appeared at the end of the Middle Horizon and continued until the early colonial period (Koschmieder 2011).

Table 3.2: AMS dates from the site of El Purgatorio (adapted from Vogel 2011)

Material	**14C age**	**calibrated 1 sigma**	**calibrated 2 sigmas**
charcoal	630 ± 34	1320-1351 AD	1301-1365 AD
charcoal	691 ± 34	1274-1300 AD	1263-1316 AD
wood	657 ± 34	1360-1386 AD	1343-1394 AD
plant	582 ± 41	1391-1435 AD	1318-1446 AD
charcoal	2160 ± 43	180-54 BC	352-2 AD
charcoal	869 ± 41	1183-1265 AD	1054-1279 AD
charcoal	2113 ± 43	158-1 BC	194 BC-50 AD
charcoal	708 ± 36	1290-1383 AD	1280-1391 AD
maize	696 ± 36	1294-1385 AD	1286-1391 AD
charcoal	822 ± 36	1227-1272 AD	1189-1289 AD
charcoal	1322 ± 37	683-776 AD	665-866 AD
maize	745 ± 36	1274-1378 AD	1230-1388 AD
charcoal	678 ± 37	1300-1390 AD	1291-1396 AD
charcoal	1019 ± 37	1024-1140 AD	995-1154 AD
charcoal	6996 ± 48	5878-5749 BC	5976-5723 BC
charcoal	3755 ± 47	2195-1985 BC	2275-1941 AD
wood	584 ± 31	1395-1425 AD	1323-1439 AD
maize	645 ± 36	1316-1399 AD	1299-1407 AD
charcoal	1023 ± 34	1023-1136 AD	995-1154 AD
charcoal	942 ± 32	1049-1201 AD	1043-1214 AD
maize	692 ± 36	1296-1386 AD	1287-1392 AD
charcoal	682 ± 37	1299-1388 AD	1290-1395 AD
maize	443 ± 31	1447-1496 AD	1435-1621 AD
maize	514 ± 31	1421-1449 AD	1400-1463 AD
charcoal	460 ± 36	1439-1489 AD	1420-1619 AD
charcoal	683 ± 36	1299-1388 AD	1290-1394 AD
charcoal	675 ± 35	1301-1390 AD	1293-1396 AD
charcoal	595 ± 35	1328-1424 AD	1318-1438 AD
maize	377 ± 35	1491-1624 AD	1463-1631 AD
maize	452 ± 35	1443-1495 AD	1426-1621 AD
maize	660 ± 35	1312-1394 AD	1297-1400 AD
charcoal	2206 ± 38	351-112 BC	359-54 BC
charcoal	2242 ± 37	357-191 BC	383-115 BC

3.4 Casma Architecture and Settlement Patterns

Characteristics of Casma architecture were initially described by Rosa Fung and Carlos Williams (1977), and consisted of large walls surrounding compounds with small internal divisions, platforms and patios connected by terraces. This new type of architecture was interpreted as a change from large ceremonial platforms of the Initial Period to a more secular architecture (Fung and Williams 1977:138).

Archaeological investigation at the site of Cerro La Cruz identified nine compounds, each containing four structures used for religious activities, as well as some scattered and relatively small terraces (Vogel 2003, 2012). The compounds were built mostly with uncut stones with adobes added later. The perimeter walls were built using a case-and-fill or chamber-and-filled construction technique consisting of placing two walls closely together and then filling them with soil, sand or rubble. According to Melissa Vogel, while the interior divisions of the compounds were not standardized or complex, it is possible to observe a pattern in the distribution of the space. It is most likely that they were divided into three sections used for different purposes, such as domestic and public functions and ritual activity (Vogel 2003:198, 2012:78).

Public architecture at El Purgatorio was built combining uncut stone and adobes, while others were built entirely of mud brick. In most cases, public structures or compounds were built of adobe on stone foundations, and in other instances, when stone walls were erected, were covered with clay plaster to give the appearance of adobe. Public architecture at the site of El Purgatorio consisted of large compounds containing platforms and plazas which served religious and/or administrative purposes. Construction was of stones and adobe bricks, although some compounds were built entirely of adobes. Public architecture contained geometric friezes, and walls painted yellow. One of the most distinctive architectonic features of the Casma polity was the platform/plaza complex paired with an enclosed area in front of a relatively small platform mound (Vogel 2016:93). The most common techniques in the construction of wide walls, found at El Purgatorio and Cerro la Cruz was the case-and-filled technique, consisting of two opposite walls of stone or adobe filled with layers of dirt, rocks and organic materials (Vogel 2016:117).

Elite compounds were multifunctional and built of more stone than adobes; however, there were some compounds built entirely of stone. It is possible that the presence of more stone than adobe in Casma architecture was related to social status (Vogel 2016). Residential areas were built of uncut stones and had very irregular rooms, cluster rooms or agglutinated rooms and in some areas showed stone foundations and *quincha* (wattle and daub) walls (Pacifico 2014; Vogel and Pacifico 2011).

In the Culebras Valley, the site of Ten Ten 1 is considered the primary center of the Late Intermediate Period and is composed of multifunctional compounds used for public, domestic, and ritual activities (Przadka and Giersz 2015:137-138). In addition, the monumental complex at the site contains adobe platforms with internal divisions for administration and residential functions. Within the monumental structures, there are public plazas and pyramids with ramps. The construction techniques and architectonic patterns at the site of Ten Ten 1 are similar to those found at the site of El Purgatorio in the Casma Valley (Giersz and Przadka 2008:33).

According to Melissa Vogel, Casma architecture's most common features were large walled compounds and terraces on slopes crowded with residential structures. Casma sites often showed spatial divisions between areas dominated by compounds, structures used by elite for ritual or administrative purposes, and areas covered with small residential terraces used by the commoners (Vogel 2016:57). In addition, the compounds at the sites of El Purgatorio, Cerro La

Cruz and Ten Ten contain elements such as the platform/plaza complex and geometric design frizzes located inside these compounds (Vogel 2016:59).

Distribution of Casma sites often occurred in the middle of coastal valleys and on hillsides commonly adjacent to road systems (Pacifico 2014; Prządka 2011; Vogel 2016). The increase of fortifications associated with Casma occupation may have indicated periods of warfare, probably among local ethnic groups or with neighboring valleys (Pacifico 2014; Wilson 1995).

3.5 Casma Socio-political Organization

The extent of Casma territory is assumed, based on the spread of the distinctive Casma Incised ceramic along the north-central coast of Peru, which comprised the coastal valleys between Chao and Huarmey (Mackey and Klymyshym 1990:198). David Wilson observed that Casma ceramics can be found in several coastal valleys including Chicama, Moche and Viru (Wilson 1988). Furthermore, the presence of Casma ceramics can be also found in the Fortaleza Valley located to the south of the Huarmey Valley (Daggett 1983; Thompson 1964).

The distribution of Casma Incised Ceramics at El Purgatorio suggests that this site was the center of a unified polity (Mackey and Klymyshym 1990: 198). David Wilson believed that the Casma or Black-White-Red State, was an expansionist state which originated in the Casma Valley (Wilson 1995:202). Wilson's classification of Casma (Black-White-Red state) as a state level society is based on corporate labor projects such as the road-settlement network, connecting the Santa and Chao Valleys and the construction of the Great Wall used to separate distinct ethnic groups. However, Santiago Uceda observed that the Great Wall is actually a walled road (Uceda 1990:43). David Wilson also suggests the presence in the Santa Valley of administrative elites acting as regional level functionaries of the Black-White-Red state (Wilson 2988:343-344).

Melissa Vogel's research at the sites of Cerro la Cruz and El Purgatorio allow her to categorize Casma as a confederacy of semi-autonomous valleys united by a common culture, ritual practices and language which at some point in their political history were united under a single state (Vogel 2016:70). Vogel's classification of Casma as a state is based on similarities in the architectural plan and construction techniques in Casma sites, the presence of Casma ceramic styles, a four-tier settlement hierarchy, social stratification, specialization, large scale production, long-distance trace, and taxation in the form of maker's marks in some ceramics (Vogel 2016:70, 2018:175). Furthermore, the presence of similar friezes at the site of El Purgatorio and in the Casma occupation at the site of El Castillo (Santa Valley) shows the intention to duplicate the style of the Casma capital of El Purgatorio, thus affirming the Casma organization as a centralized state (Vogel 2016:70, 2018:175).

Archaeological research at the Casma sites of Cerro la Cruz (Vogel 2003, 2012), El Purgatorio (Pacifico 2014; Vogel 2011, 2016; Vogel and Pacifico 2011), and Ten Ten (Giersz and Prządka 2008; Prządka 2011) has provided insight into Casma social stratification. Large walled compounds and platforms often built with adobes are associated with the elite groups who were possibly in charge of public events as well as administrative functions. Commoners' residents were usually located on hillsides or peripheral areas and built of stones and *quincha*. At the site of El Purgatorio, Vogel observed that social stratification appeared to be correlated with special distribution of compounds and residential areas (Vogel 2016:190). The ruling elite were located in Sector A, which contained orthogonal compounds, urban planning, and expensive construction materials. The intermediate elite were located in Sector C, which contained small compounds built with uncut stones and adobes. Commoners lived in Sectors B and D, composed of a series of terraces built on a nearby hillside (Vogel 2016). David Pacifico conducted archaeological research at Sector B south at El Purgatorio and concluded that among commoners there were three social levels based on size, access to construction material (stone vs adobe), and spatial distribution (Pacifico 2014:238).

While the spatial distribution of compounds and residential areas might suggest marked social divisions, it is possible to find social subdivisions within each sector at El Purgatorio. These divisions might be related to variations in residential architecture. In addition, mortuary practices such as type of tombs, from simple pits to adobe chambers, and variation of burial goods might indicate various social statuses at the site (Vogel 2016:190-191).

CHAPTER FOUR:

THEORETICAL APPROACHES

4.1 Household Archaeology

The most important aspect of studying households is the notion that they are the physical manifestation of activities and social organizations (Ashmore and Wilk 1988; Wilk and Rathje 1984). Knowledge of social organization at the household level provides an understanding of social structures and interactions within the total cultural system (Bawden 1982), as well as identification of social evolution through the study of household remains (Ashmore and Wilk 1988). The view of a household as an adaptive mechanism whose structure is the result of external environmental and social conditions eludes the notion that households did not follow the same strategies under external circumstances and that decisions were made under variable circumstances (Hendon 1996:48). Households are an important mechanism of social reproduction, since socialization occurred within the household and household agency affected social structures by changing social relationships and the degree of interactions (Souvatzi 2012:18). Furthermore, changes that occurred within the households were previously conceptualized as a response to larger social changes rather than the center of social action displaying the complexities and dynamics of everyday life (Souvatzi 2012:16). Household were formed by individuals who were or were not genetically related and the composition, structure and internal or external household interaction changed according to seasonal, annual, life-cycle, or other timescales (Matthews 2012:183).

Meredith Chesson (2012) conceptualized homes as the areas that contained meaningful repetitive actions or behavior of the people who inhabited them. This perspective assumed that people were thinking and feeling while they were producing pottery, building structures, eating and exchanging goods. Archaeological remains of daily and repetitive actions can contribute to understanding how social, economic, political and ritual links of daily life were reconstituted, renegotiated, and changed at the household level (Chesson 2012:48). Every individual learns how to elaborate things in a community while forming ideas about how the world works. While these pre-exiting structures provide guiding physical, cultural and social rules for all new production, every act of production exists as a continuation of the past. In everyday practices, people modify these rules even as they try to reproduce them, so that rules are never fossil-like and an individual action is never random (Michelaki 2008:377).

Recent studies on house societies follow the Levi-Strauss approach of the house as a moral person and as a place of multigenerational social institution. This approach has been used in archaeological research of households to move beyond static or taxonomic views of kinship, social structure and the materiality of the house (Rainville 2012:141). Instead of focusing on the study of descent, house societies place the house as a center of social relations among individual and larger social units (Douglass and Conlin 2012:5). The house is the physical and social location that places individuals within a complex web of categories and relationships that can be mapped against physically defined spaces (Gillespie 2000:18). Houses are not just the static physical structure; instead, houses or dwellings shape and reflect human life since they are condensers of meaning and the center of human experience (Moore 2012). Furthermore, domestic places are physical and social spaces that actively contribute to the development of identity and memory from which local and localized histories grow (Hendon 2010:96).

Households can be defined archaeologically in terms of activities (production and consumption) performed within the physical structure of a dwelling (Ashmore and Wilk 1988). Households are the primary production and consumption units within a society and provide the vehicle for which the resources are pooled, stored, and distributed to their members (Hirth 2009:1). Most archaeological research is focused on the study of specialized production within a household and the production of exchange items outside of the domestic group (Hendon 1996). The identification of specialized production within domestic contexts is through the presence of residues of the good produced that exceeds the expected auto-consumption of the domestic group (Costin 1991, 2001; Schortman and Urban 2004).

The importance of the study of specialized production has served to establish the complex forms of political organization marked by differences in wealth, power and status; however, the study of production activities oriented towards satisfying household members' immediate needs (food production) is seen as less important in the process of social evolution (Hendon 1996:490). Most craft production was conducted within domestic contexts and food production was important for household growth in proportion to the economic institutions that supported inter-household exchange and resource exploitation (Hirth 2009:13). The concepts of full-time and part-time craft production did not provide an understanding of the function and structures of domestic craft production, and thus the emphasis, according to Hirth, should not be on the amount of time spent in the production of craft, but in the economic strategies used by domestic groups, and how craft production was integrated into their domestic economy. For this reason, food production cannot be studied separately from craft production, since the responsibilities of specialists did not change the other productive activities performed within the household (Hendon 1996).

Charles Stanish argued that archaeologists can only recover two of the three components (domestic function and co-residential patterns) that are essential for households, as originally proposed by Donald Bender in 1967. According to Stanish, the important aspect of the study of households is identifying the minimal co-residential domestic groups through the analysis of material remains. Spatial segregation within the domestic structure is the most obvious indicator of a minimal domestic unit. The concept of a household enables one to define a minimal architectural unit of the people who resided together and shared basic domestic economic behavior (Stanish 1989:11). Furthermore, the significant variation in the distribution of local and non-local ceramic vessels between domestic and non-domestic context (e.g. burials) can indicate external exchanges in which non-local items are used in non-domestic contexts for elite groups to legitimize their authority, while households contain materials produced within that household that can be used as ethnic markers since the household contains daily-used artifacts. In addition, architectural plans can also be used for ethnic identification because the spatial pattern in a household can show variations in relation to ethnic affiliation (Stanish 1989:13). The presence of objects, like ceramic, stone tools, textile, and metal, might be the product of exchange relationships that do not reflect local production styles, while domestic architecture represents local cultural preferences based on the resident population's construction of dwellings. Cultural or ethnic differences between social groups can be reflected in the size, nature, and composition of a domestic structure (Aldenderfer and Stanish 1993:5).

Studies of domestic structures on the north coast of Peru observed at the site of Chan Chan that the residents of domestic areas constituted a distinct social class which consisted of a large group of specialized artisans, and it is possible that within this group existed significant variations based on status and options that enabled social mobility. Populations living in these domestic structures were highly organized through their kinship system and occupational activities (Topic 1982:174). At the Moche site of Galindo, Garth Bawden identified domestic structures comprised of a rectangular benched enclosure, food preparation area (kitchen), and one or two small rectangular deposit areas. The architectural pattern of residential units at Galindo suggests that they served the needs of a single family (nuclear family) in which food production areas were separated from the rectangular benched enclosure where social interaction occurred (Bawden 1982:178).

Archaeological research conducted in the urban areas at the Huaca de Moche site has identified a complex network of household compounds that suggests the presence of corporate groups responsible for the creation of internal spaces and the activities performed within the household. Most of these household compounds were multifunctional where domestic activities were defined by the evidence of gridding stones (*batanes*), hearths, and benches along with craft production activities that included ceramic, textile, metal and, maize beer (*chicha*) production have been identified (Chapdelaine 2001). The size and construction materials of this domestic architecture could have been related to differences in social status, where lower status houses were occupied by nuclear families compared to larger houses with public areas that might have been occupied by multifamily groups. It appears that at the Moche site, extended family households were organized as corporate groups that pooled a wide variety of resources and adapted their production and distribution strategies (van Gijseghem 2001). The diachronic study of some residential structures at the Moche urban center revealed changes in the distribution of the internal spaces and complexity within the household. The increased spatial complexity in the last periods of the Moche occupation at the site was related to the increased variety in food consumption and in the diversification of craft production activities (Uceda 2010). The reorganization of the urban plan is directly associated with changes in the social organization, whereby power that was concentrated in the temple was transferred to urban residents, who not only continued producing and consuming sumptuary goods, but were also engaged in ceremonial and distribution activities (Uceda 2010:291).

The study of Moche rural households at the Ciudad de Dios site in the middle Moche Valley was oriented towards observing the state's influence on rural household life. The evidence from this site suggest that the population was self-sufficient and capable of producing their own food and plainware pottery. In addition, residents of Ciudad de Dios grew and processed large quantities of corn at the expense of other foods, such as beans. Corn was used by the local elite to produce *chicha* for social events (Ringberg et al. 2008:352). The presence of camelid bones suggests that the inhabitants of this site had access to llama meat and that the large quantities of jars and cooking pots is indicative of their ability to store large quantities of food and drinks. According to Ringberg, Castillo and Bernier, the analysis of clay figurines at the Ciudad de Dios sites indicates that most domestic activities conducted at this site were performed by women, to include specialized tasks such as metal production, which was an activity conducted by men in the Moche culture. Furthermore, the production of figurines that occurred at the Huacas de Moche and Cerro Mayal sites makes it seem likely that Moche elite controlled the distribution of these figurines. The presence of figurines in Ciudad de Dios does not reveal if they were intended for individual use or for the household, but they were obtained either as gifts from Moche elite or obtained during visits to ceremonial centers (Ringberg *et al.* 2008).

Studies of rural communities outside of the Moche Valley have been conducted in the Zaña and Jequetepeque Valleys, and it was noted that these small to intermediary scaled settlements were located across irrigated areas and that most of the household clusters changed during the late period of the Moche culture (Dillehay 2001). There is evidence of abandonment and reuse of most of these sites that could correlate with a new kind of interaction amongst the local social groups due to the rise and fall of the surrounding large urban settlements. Furthermore, Dillehay noted that rural communities were not directly controlled by urban centers since there rural settlements established social relationships with other non-urban settlements located in distant regions which were independent from the urban center. This perspective of the city as being connected to rural communities and dependent on economic and social forces located in the countryside, as well as some rural settlements, may have operated outside the control of the city (Dillehay 2001:263). There is no doubt that Moche elites ruled from large urban centers; however, during select periods commoners conducted their activities without state intervention and maintained their independence even during periods of strong centralize authority.

The study of households can contribute to better understanding the social organization and changes that occurred at the local level. On the other hand, regional approaches tend to see social changes as the product of the influence of the centralized authority or as a result of the interaction with elites. While regional or intraregional approaches can shed light on past social changes as they relate to the rise and the fall of large polities, these approaches cannot provide insights into household organization.

4.1.1 Communities of Practice and Identity

The material culture expressions which are relatively stable over time is depends on how knowledge is pass from one person to another, and from one generation to another (Wendrich 2013:1). Learning occurs as part of social interaction and the communities, rather than individuals, are the source of learning (Sassaman and Rudolphi 2001:407-408). In addition, crafting is one of many ways in which people maintain and reproduce social identity and social relations, and the process of crafting depends on the people's experiences whose social relations are situated in a specific historical and cultural context (Sassaman and Rudolphi 2001:409). According to Cathy Costin (1998a), craft and crafting can be found as part of a society's economic, social, and ritual systems, among others, and through the process of crafting we can observe the formation and expression of identity. In addition, artisans, through crafting, manifest ideas about roles, identities, and relationships in the social world (Costin 1998a:3). There is an ongoing learning (often informal) within the communities of practice which is based on the sharing of knowledge and experiences in the social group. In addition, communities of practice share knowledge for various reasons and in different ways (Wendrich 2013:5).

Communities of practice can be defined as groups of people who through regular interaction lead them to follow expectations of social behavior. Communities of practice reflect different scales, modes, intensities, and types of interactions which can be identified through the study of daily life. The scales of interactions can range from regional settlement systems to individual site organization, and from different areas in a single site to a household (Gilpin and Hays-Gilpin 2012:45).

Communities of practice studies have mostly focused on ceramic production, including decorative treatment, temper choices, sources of raw materials, among others. In the study of Stalling fiber-tempered pottery in the Savannah River region (Georgia-South Carolina), Kenneth Sassaman and Victoria Rudolphi argued that the consistency in the technology of pottery manufacture was due to post-marital residence patterns (mainly women moving into their husband's communities), which ensured continuity through generations among women. On the other hand, decorative expression and pottery function allowed Stalling river communities to be part of a regional culture separated from their coastal counterpart. These differences in material expression shows that potters participated in various communities of practice not just through residential proximity and inheritance, but also through affiliation and changes in social identities, from daughter and daughter-in-law and from sister to wife (Sassaman and Rudolphi 2001:422).

In the study of ceramic production and circulation of Santa Fe Black-on-White pottery in the New Mexico Basin, Eckerd *et al.* (2015) combined mineralogical and chemical compositional data to observe various provenance locations that can represent different communities of practice. In this study, three production provenances were identified, and while these provenances groups do not equate with communities of practice, the sharing of technological traditions by potters are the result of social networks embedded in communities of practice. In addition, clay and temper selection are the early stages in pottery production and three communities of practice (based on provenance) can help to identify social networks of potters interacting across provenance zones (Eckerd *et al.* 2015:8).

In the study of Sikyatki polychrome style pottery in the northeastern Arizona, Dennis Gilpin and Kelley Hays-Gilpin observed that this style appeared after various Pueblo groups settled in Arizona. While some Sikyatki pottery was produce by specialists, other were produced at the household level in which various production traditions were used. The development of the Sikyatki style was the result of the integration into a community of identity while at the same time potters maintained their own family migration histories which are documented in the pottery traditions in the area (Gilpin and Hays-Gilpin 2012: 53-54).

While communities of practice emphasized the learning process of potters, pottery production also occurred within the community of identity, which are social networks where potters share a group identity. Membership in a community of identity is related to conscious production decisions which emphasizes or deemphasizes group membership in specific social contexts (Eckerd *et al.* 2015:1-2; Eckert 2012:55). Identity is the result of a process of practical rather than static actions which is found within the social field, that in a specific time and place merge around shared involvement in certain projects, communities of practice rather than culture (Thomas 2014:122).

4.1.2 Community and Neighborhood

Household studies are integrated in the archaeological analysis of communities, since the community is the social institution that is generated by supra-household interactions which are structures and synchronized by a set of places within a specific span of time. Daily interactions develop in sharing premises and understanding that can be mobilized in the development of common community identity (Yaeger and Canuto 2000:5-6).

William Isbell (2000) distinguished between the natural community and the imagined community, in which the former is conceptualized as a homogenous unit that is created by the interdependence of the members and assumes a high degree of stability. The imagined community on the other hand, address that the relationship between the social groups, the territory, economy, politics, learning, and so for exits only in the ideal world, not in the real one. The imagined community is fluid and changing, as actors select available alternatives, attempt to create new ones, and pursue the goals they perceive (Isbell 2000:249). According to Isbell, archaeologists need to study imagined communities, since this approach offers a view of individuals in the past who behaved like agents and uncovered social factions that promoted agendas opposed by others.

The community is not a natural unit, but a dynamic and socially constructed identity group created as a result of conscious and unconscious practices of individuals (MacSweeney 2011). The limitation of the archaeological view of community as a social group, created to share practices that develop a sense of common identity, is that any social group can be considered a community (MacSweeney 2011:1). In order to observe a community in the archaeological record, MacSweeney separated the relational community and the geographical community; archaeologist should focus on geographical communities since they are rooted in a particular locality such as a neighborhood or village (MacSweeney 2011:19).

Neighborhoods are defined as districts with distinct physical boundaries and functions. The boundaries are defined by the inhabitants and are based on a pattern of social interaction and a sense of common identity (Keith 2003:58). According to Keith (2003), neighborhoods are composed of households, and while households are often used as a unit of analysis, not all activities are performed within the boundaries of the physical space. Neighborhoods, on the other hand, are areas of local action and interaction within a contiguous area that involves people from various households. At the Teotihuacan site, districts were heterogeneous, containing civic-ceremonial structures, residences occupied by high and low status households, and various craft workshops (Cowgill 2003). In the city of Tiwanaku, activities were not conducted principally in the domestic realm and residents often incorporated ritual practices and specialized economic activities. Areas where people ate, slept, and raised their children often were the same places they conducted periodic ceremonies for trading (Janusek 2003:268). These compounds housed supra-household groups that were integrated through an ideal of kinship and lineage. Some groups within the city of Tiwanaku apparently maintained ties and affiliation with non-local regions and polities and might have originally migrated from those regions (Janusek and Blom 2006:248).

4.2 Craft Production

The organization of the production of goods, their distribution and consumption in pre-industrial societies is commonly used in the study of social complexity of the past. Besides the domestic use, goods were also used in social, political and ritual spheres. In this sense, understanding the context and organization of production is important in understanding daily life, political economy and the role of objects in political and social relations (Costin 2004:189). Studies related to understanding the organization of production have focused on attached and independent production (Costin 1991). Attached specialists were subject to elite sponsorship and produced goods or services used by the elite, while independent specialists produced goods and services according to the demand of the community or population (Costin 1991; Costin and Hagstrum 1995; Earle 1981). In this context, independent production aimed to satisfy the needs of the community or society in which utilitarian objects were produced and distributed based on household needs. On the other hand, attached production was oriented to manufacturing fine items in specialized workshops (Brumfiel 1987; Costin 1991; Costin and Hagstrum 1995: Sinopoli 1988). Besides the organization of production in pre-industrial societies, other components included cultural and social identity of the artist, cultural influences on the organization of production, the cultural meaning of the objects and the social and political context in which they were used (Costin 2004:190-191).

The study of production is not just the understanding of the transformation of raw materials into objects, but also understanding the relationship between producers and consumers, in which the former includes the limitations of raw materials and technologies, as well as behavior and choices, and the latter refers to the social dimensions of production as well as how skill, gender, social identity and status of the producer affects production, use and value of the product (Shimada

2007:2). In addition, the production of craft goods and the extraction of resources needed by the household were related activities which could had included daily or seasonal schedules in which various activities share knowledge, resources and labor (Hagstrum 2001). The majority of production was conducted in the household by independent specialists engaged in craft production to support their families and meet other social obligations. The scale and intensity of domestic craft production can be grouped into intermittent crafting and multitasking, in which the former is the periodic production which occurred along with other household activities and the latter was the production of multiple crafts in the same household (Hirth 2009).

In more complex polities in the Andes, distinctive economic activities created social differences or segments within the urban center recognized through spatial boundaries. Production of sumptuary and non-sumptuary goods was embedded in a large socio-economic system, in which production was connected through social affiliation of distinct groups (Janusek 1999, 2009). Production of goods reinforced the social division of corporate or ethnic groups, in which the production of specific goods, and the goods themselves were important markers of group identity (Janusek 1999:125). Furthermore, individuals or groups who had wider access to raw materials and skills to produce objects would extract resources from other households whose members produced fewer craft objects. The differences in the production of objects among households increased social differentiation (Schortman and Urban 2004). Production of craft goods was important in creating social networks, and individuals or groups without products or labor to contribute to the production and distribution systems were not part of the social network (Costin 2015:1).

Studies related to the emergence of social complexity in the Andean region attribute the role craft production, exchange and ideology in the power relations between elite and non-elite groups (Vaughn 2006). At the site of Huaca de la Luna, the urban area was organized through compounds according to various craft activities, including ceramic and textile production, (Bernier 2010; Chapdelaine 2001, 2009; Uceda 2010). The presence of large storage areas within some of these compounds indicated that craft production exceeded household needs, and it is possible that high-status individuals or members of the ruling elite were the heads of lineages or corporative groups producing various types of crafts at site (Chapdelaine 2001:84). These family leaders had the right to accumulate large quantities of goods within the storage areas situated at the household without the direct control of the Moche state. Furthermore, the redistribution of goods at the Moche urban center was the result of an informal exchange system that possibly took place in areas outside the urban center or in some areas, such as plazas, located among the various compounds at the site (Chapdelaine 2009:190). While this production was controlled by elite individuals, craft goods were circulated within the urban center and were not exclusively produced to satisfy the needs of the ruling class (Bernier 2010). Artisans living at the Moche site were organized in a type of intermediate phase between independent and attached production (Uceda 2010:290). Similar organization of craft production was found at Tiwanaku, where the manufacture of craft was neither attached nor independent; on the contrary, it was organized in a form of socially embedded household production which placed emphasis on social context for craft production and distribution (Janusek 1999:126).

During the Late Intermediate Period, craft production at the site of Chan Chan (Chimú Capital) was controlled by the state and organized in a horizontal integration of specialists, which allowed immediate cooperation between producers in favor of a more efficient production (Topic 1990:164-165). While there is evidence of attached craft production at Chan Chan oriented to satisfy the needs of the state, other goods, especially utilitarian objects, were produced to satisfy the demand of a wider range of consumers (Topic 1990). Craft production in Chimú provinces varied, compared to Chan Chan. At the Chimú provincial site of Manchan, craft production occurred in the households without the direct control of the elite. However, household members could have intensified household production to satisfy the need of the elite at Manchan, which did not interrupt their domestic activities (Moore 1985).

During the Early Nasca Period (A.D. 1-450), fine polychrome pottery was produced under a centralized system at the political center of Cahuachi. Compositional analysis in Nasca pottery indicates that clay sources situated near the site of Cahuachi allowed elite groups to have control over the production and distribution of goods which contained elite ideology (Vaughn et al. 2006). The control over the production and distribution of polychrome ceramic vessels allowed the Nasca elite to build their prestige during the Early Nasca Period, not only through the materialization of elite ideology, but also through the distribution of ceramics among Nasca people (Vaughn 2006). The distribution of polychrome pottery occurred during public events, such as feasting, at the site of Cahuachi, in which individuals from various places in the Nasca Region attended public events and obtained polychrome ceramics, and later the public rituals at Cahuachi, were replicated at the household or communal level (Vaughn 2004). However, during the Late Intermediate Period (A.D. 1000-1476), the decline of ceremonial centers produced changes in pottery production, where ceramics were manufactured at different sites, including small villages. This new production structure could have been organized for the local elite in order to obtain goods for exchange which were used in feastings activities (Vaughn *et al*. 2006).

During the Middle Horizon (A.D. 600-1000) the site of Conchopata at the Huari center in Ayacucho contained evidence of craft production, specifically fine ceramic vessels. The production of polychrome vessels not only required skill and time, but also a knowledge of Wari ideology and therefore supervised by state functionaries (Pozzi-Escot et al. 1998). However, the variability in style and shape of ceramic vessels, along with the presence of high-status burials at Conchopata, suggests that potters were members of elite groups (Cook 2004). The production of pottery for cooking and serving purposes were used in organized feasting events where food and drinks were consumed and usually sponsored by the state (Cook and Glowacki 2003). In addition, evidence of multicrafting, including pottery and *chicha* brewing (maize and *molle*), took place at Conchopata as part of feasting events. It is possible that women, as member of polygynous groups, were in charge of pottery and *chicha* production used in competitive feastings events sponsored by household leaders or lords (Isbell 2007). At the Wari provincial site of Cerro Baul, on the other hand, elite groups were producing fine polychrome ceramic vessels as a strategy to monopolize the Wari technology and ideology. Furthermore, while evidence of feasting events is present at Cerro Baul, the polychrome ceramic was not distributed at these events since fine vessels were absent within lower elite households (Nash 2019).

Craft production at the Casma site of El Purgatorio was in some instances controlled by the elite, especially in the production of pottery and *chicha* (maize beer), while other craft were produced at the household level along with subsistence activities (Vogel 2016). The presence of ceramic workshops and areas of *chicha* production next to elite compounds suggested that these two main commodities were supervised by elite groups, since they were important in feasting activities. However, ceramic vessels and *chicha* were also produced at the household level and were not exclusively produced for elite demand since remains of these activities were also found within commoners' households (Pacifico 2014; Vogel 2016). Textile production was an important activity at El Purgatorio and evidence of its production was found among elite households. While the level of elite control, if any, over the textile production is unclear, evidence at El Purgatorio suggested that textiles were produced at the household level (Vogel 2016:171). At the Casma site of Cerro la Cruz, situated on the northern frontier of the Casma territory, the level of control that elite exercised over craft production at the site is unclear. Ceramic production, however, was to some degree controlled by the local elite. Other crafts, such as textile and *chicha* production, were conducted at the household level (Vogel 2003, 2012).

4.3 Approaches to Landscape in Archaeology

The relationship between human activities and the use of landscape in the past has become a topic of inquiry in contemporary archaeological research. Early approaches to the study of landscape were oriented to the observation of human impact on and interaction with physical space (David and Thomas 2008:28). In this sense, human relations within their environment were interpreted as an adaptive response of people in which subsistence strategies and settlement patterns were an important part of archaeological investigation. However, contemporary approaches do not see the archaeological record as adaptive but rather as the interaction of people who engaged with their environments in various ways. The archaeology of landscape is the study of how people observed their world and the way in which they interacted through their physical space, as well as how they manipulated and were influenced by their location (David and Thomas 2008; Preucel and Meskell 2004). It is also concerned with the conscious and unconscious way in which the land was shaped and how people organized their space (Papantoniou and Vionis 2017). In addition, landscapes were the places where memory, identity, social order and transformations were constructed, played-out, reinvented and changed (Ashmore 2004; Knapp and Ashmore 1999). They were also particular ways of contextualizing the world as well as defining physical entities. The same physical landscape can be observed in many ways by different people even at the same time (Layton and Ucko 1999). Landscapes are not just the surrounding environment constantly used by humans, but instead are perceived and interpreted as a reflection of social context.

The meaning ascribed to landscapes today and in the past is contestable; however, the interpretation of structures in aesthetic, symbolic, religious, and ideological terms is defined by the landscape (Silverman 2004:4). The natural landscape is the physical surrounding that is known by the people and in some instances, they can associate natural features such as mountain peaks, rock formations or caves to sacred or mythological realms (Lane 2008:240). The cultural landscape on the other hand, incorporates every aspect of culture which included not only the understanding of the world but also practices, social and spatial organization, economic activities, land ownership, social identity and so forth (Strang 2008:52). Landscape can be an important aspect of political life in which authority is organized through it. In this sense, landscape is viewed as a social artifact produced and reproduced through spatial practice. These social acts create spaces that influence the extent of a house or family building as well as the extent of a polity (Smith 2003: 25).

In the Andean landscape, studies are commonly related to sacred places such as caves, lakes, *huacas*, and mountains. The symbolic meaning of these physical attributes has been used to explain ritual practices, the organization of the world based on symbolic landmarks, and the relationship between these features in the creation of social order (Contreras 2010). Andean people created multiple overlapping geographic, hydrological, ecological, cultural, economic, and social landscapes. Social relations produced the landscape and spatial organization was constructed through constant negotiation (Silverman 2004:4). While Andean landscapes are associated with ideology, during times of imperial expansion landscape also served practical purposes. Wari expansion was oriented to locating water sources for agriculture, and conquered important sacred places in the Andean region associated with water. The expansion and construction of Wari provincial sites across the Andean territory aimed to manipulate natural and sacred water sources (Glowacki and Malpass 2003).

Another important way to study Andean landscapes is through environmental variability. Climatic variation in the past, such as the El Niño phenomenon, triggered human modification of the landscape in order to reduce vulnerability during environmental changes (Contreras 2010). At the same time, social identity was rooted in the Andean landscape where the distribution of funerary sites and ceremonial centers served as meaningful areas in which people articulated, negotiated and maintained local identities over a lengthy period of time. The relationship between people and places shaped their identity and memory at the community level on the same scale as regional ethnic formations (Herrera 2007:179).

The study of households and landscapes is related to the way that households or communities are integrated into that landscape at different scales and the way in which their individual or collective actions define and shape their landscape through everyday practices (Foxhall 2016:325). Communities are not located solely in physical spaces but are groups integrated though the sense of belonging or by common interests rather than through ownership of a territory (Blake 2004). Some settlements use their landscape for multiple purposes, such as natural defense areas, ancestor veneration and distribution of various household activities. The Late Inka site of Palo Blanco was built around flat hilltops and their structures were arranged according to the topography and natural resources available in the vicinity. Some structures were built near water sources for easy procurement, while others structures located at a lower elevation were associated with food processing as well as stone tool manufacturing. Lastly, small rooms were related to eating, resting and protection from the weather (Wynveldt et al. 2016).

Studies conducted on elite Chumash households in southern California aimed to understand the development of hunter-gatherers alliance networks (Robinson and Wienhold 2016). Within Chumash territory there are several pictograph sites which are commonly associated with resources areas which were visited as part of seasonal movement patterns (Robinson and Wienhold 2016:367). The complex topography observed within the Chumash territory allowed some villages to move freely throughout the landscape. This geographical advantage in terms of movement and securing resources offered to household or villages maintain their status among Chumash groups. Activities conducted in the household, along with understanding of the physical terrain, offered some household access to specific resources and established social relations along the landscape, allowing to differentiate themselves from other households (Robinson and Wienhold 2016).

The study at the Swahili site of Songo Mnara has allow to identify a series of territories within the town. Some of these territories were intended to develop community ties such as religious places and burial sites, which are define places of practices of prayer and memorialization. In addition, ancestor and houses create a connection between family and place, in which the former function as a territorial marker tie to a place, and the latter the investment in the place that they represent (Wynne-Jones and Fleisher 2016:360). Outside the town different household activities might provide access to agricultural areas or marine resources and particular households or groups can be tied to certain territories of activities (Wynne-Jones and Fleisher 2016).

4.3.1 Taskscapes

Tim Ingold (1993) argued that people believed that their daily activities extended their social connections. In addition, Ingold suggested that these activities were not isolated, but rather were carried out within living spaces or residences. Every activity or task had its own importance and status within the larger group of tasks, and was conducted in series or parallel to many other individuals working in the same space (Ingold 1993: 158). In this sense, the taskscape was the whole group of mutually related activities. As Ingold pointed out, just as the landscape was the array of related features, by analogy, the taskscape was the array of related activities (Ingold 1993: 158). These tasks also involved human labor and the time spent on the task performance was not self-evident but rather socially defined in what Ingold called the temporality of taskscape. In addition, through the process of conducting daily tasks, people learn social rules and constraints which are embedded in mundane bodily practices. A child grows up in a routinized domestic space and learns particular practices, movements, and so on which are appropriate, while others are not. In this way, individuals learn social rules through the practices of daily life within the house (Hodder and Cessford 2004:18). Practice pays attention to creative moments in time and space in which change is generated. This changing process occurs in microscales actions and representation which also exist simultaneously in macroscale processes (Pauketat 2001:87). Taskscapes are fields of learning which are not just imitating or passing-down skills through generations, but rather attending to features in the landscape and a process of apprenticeship into the taskscape (Roddick 2013:291). This signifies that things and practices might have changed according to physical space and time, and at the same time things and practices can have double meaning of both household differentiation and community identification (Souvatzi 2012:15).

In ceramic production the activity or task of selecting the different raw materials is not a random activity. Potters engage with the landscape in which raw materials do not exist in isolation, but instead in association to other resources or features. The distribution of the resources in the landscape can provide to the potter different opportunities to perform various task or activities which can influence how they move over the landscape (Michelaki *et al.* 2015: 786). The use of characterization analysis and raw material surveys can be used to observe the variability of clay sources, the distances from the site and the properties of raw materials and their distribution in the landscape and the relationship with other sources and features. The production of ceramics is not a static activity confined at a particular habitation site, but instead a constant engagement with the selection of the sources and the landscape orientation (Michelaki *et al.* 2015:822-823). In the archaeological research conducted in the Taraco Peninsula (Bolivia) Andrew Roddick (2013) observed that decorated ceramics are chemically and mineralogical similar to local clays and Late Formative farmers could have obtain the raw material as part of their daily activities. Andean pottery production is embedded in the seasonal rhythms of other activities such as agriculture or pastoralism (Roddick 2013:297-298).

The taskscape can be useful in conjunction with the knowledge of the *chaine operatoire*, which can also help to understand the relationship between people, places and things. Tasks cannot be considered in isolation, but in the interaction of various tasks that produce the landscape, as well as the relation between people and the temporalities of social life (Conneller 2010). The *chaíne opératoire* approach can be used to define stylistic behavior and cultural and social identities. By analyzing production sequences, it is possible to identify similarities and/or differences in behaviors within the same cultural group and among other groups over time (Garcea 2005:215). Individuals learn the way to produce their objects in a social context while been influenced by factors of identity, such as family, gender, culture and so forth (Jeffra 2015:142). The relationship between the *chaíne opératoire* and the social group can be explained in the way that the mastery of technical practices is related to the process of inheritance which occurs at the individual and collective levels. At the individual level, the tutor teaches the learner how to achieve a task, guiding the learner not only through the learning process but also in the reproduction of the task, in which at the end the skills acquired become embodied. At the collective level, transmission occurs within a group of individuals related to social ties which, at the same time, determine the social perimeter of the way of doing tasks is transmitted. The rules that determine the transmission of skills are the same rules that maintain cohesion of the group and facilitate its reproduction. The nature and structure of the groups within which a "way of doing" is transmitted are highly variable (Roux 2016:103).

While the taskscape provides a way to interpret the manner in which people used and contextualized their landscape, this approach also has its limitations. On one side this approach ignores the political aspect of the landscape, which can restrict access to people based on their differences of status. On the other hand, taskscapes emphasized daily activities (flint-napping, food collecting) in a specific period and place, which limited the observation of changes within a social group or community (Conneller 2010:188). The problem with the taskscape, according to Conneller (2010:189), is that it produces an archaeology that is too general (generic tasks) as well as too specific (particular sites).

4.4 Boundaries and Borderlands

Geographical distribution of artifacts has been used by archaeologists to define the area in which a society or ethnic group occupied a territory in any given time period. The relationship between material culture and territory has dominated Andean archaeology and has shaped the understanding of ancient polities. While the identification of territory and boundaries are important for archaeological research, this view can also create the notion of a homogenous culture with the same cultural expressions on a given geographical area. The areas that were used to create social or physical divisions among different ethnic groups such as boundaries, border or frontiers have been defined in various ways. Boundaries define members and non-members of specific ethnic groups, but they can also act as places where social networks allow interaction between different social and ethnic groups, producing innovation and changes as well as manipulation of group identities (Mullins 2011:5).

Boundaries in this sense can be interpreted as areas of cultural interaction which offered a separation of cultural traits as well as cultural transformations. Boundaries mark the separation of different entities, and in this sense a more inclusive separation aims to differentiate who belongs to the ethnic group and who does not. While boundaries can be observed as markers of separation, they can also be places of integration between entities. The manner in which boundaries allows integration rather than separation depends on the degree to which ethnic groups absorb foreign traits. Cultural traits usually serve to establish boundaries among ethnic groups as well as natural landmarks. Boundaries are social constructs imposed by humans in an arbitrary way in order to organize their environment (Feuer 2016). Boundaries can also be interpreted as borders which establish divisions between people and objects. They are also fixed lines of separation between two administrative or political units (Rodseth and Parker 2005). On the other hand, borders are also considered places of interaction between groups across boundaries involving materials moving in different directions during different periods (Mullins 2011).

Ethnicity is one of many forms of group identity (Barcelo 2012:531), and difficult to recognize archaeologically (Vogel 2016:182). Ethnicity has been defined as all social and physiological phenomena related to the cultural construction of a group identity (Jones 1997:xiii), a form of group identity in which membership is determined by kinship and beliefs about a shared descent (Mac Sweeney 2009:102). Ethnicity is the mechanism by which groups of individuals sharing a common identity use culture as a symbol of internal group solidarity in opposition to other social groups (Reycraft 2005:55). In the Andes, Paul Goldstein compares *ayllus* to the broader concept of ethnicity, since *ayllus* is a kin-based group larger than a family or lineage. In addition, ethnic groups can be defined by their solidarity based on common pattern of behavior, values, and standards as a reflection of a common history (Goldstein 2005:29-30). On the other hand, John Janusek defines ethnic groups as macro-*ayllus* (which are composed of minor *ayllus*) in which social groups share a common ancestor and a landscape of sacred places (Janusek 2004:30-31). In the study of ethnicity concepts in the Andean area, Emily Stovel observed that ethnicity is often defined as an active, reflective and situational process that is studied using a synchronic and normative approach. Stovel argues that by separating the concept of ethnicity from culture, it is possible to see clearly the process by which materials and behaviors come together to reflect a community because of changing social and political contexts. Ethnicity is an embedded cultural activity, composed of a series of behaviors that might partially differentiate groups in the Andean region (Stovel 2013:14).

Ethnicity should not be used interchangeably with social identity, because ethnicity is only one component of an individual identity, which might include membership or non-identification with an ethnic group, or identification with various groups, in the case of individuals with more than one ethnic heritage (Vogel 2016:183). For the archaeologist, the construction and maintenance of identity in the past was not as marked as in today's societies, and our current social categories such as gender, social status, and race might not have existed in the same way in the past (Meskell 2002:281). Identity is a set of particular categories or attributes within a universal social structure. In addition, Meskell and Preucel argue that identity is the product of social and political action that can be found through practices and interaction with others and is divided by multiple competing discourses which are unstable, fragmented and situational (Meskell and Preucel 2007:133). Activities that people engage in daily such as eating, dressing, building, disposing of waste, and speaking with others are the mechanisms by which people and individuals are categorized by others or by themselves. In this context, various everyday practices appear at different times and potentially, as different identities. Identities are multi-layered, contextually dependent and open to change and contraction (Gardner 2001:17).

The most widely used category to establish the separation of two ethnic groups or large societies is probably the frontier. While this separation is important to differentiate cultural traits of various groups, it is also important to archaeologists in recognizing the cultural material expression of traits which identify the extent of a large society or polity. Although the moving of people to new lands is part of the process of establishing the frontier, these groups are not necessarily culturally homogeneous with the hinterland, and cultural change in the frontier does not occur as a result of innovation from the core or center. Frontiers are zones of cultural interaction, in which cultural traits can be reinterpreted as well as transformed in order to create new group identities (Lightfoot and Martinez 1995). Frontiers had many dimensions, and while some might be physical and ideological as well as military and cultural, they often also served as religious and political boundaries. In addition, frontiers were also zones of cultural contact allowing the creation of new identities and ethnogenesis (Rodseth and Parker 2005). These contact zones or frontiers are composed by different ethnic groups in which economic, political and religious systems meet (Eaton 2005: 52). Ethnogenesis also occurred in the frontier as the result of two main processes (hybridization, or merger, and fission, or fragmentation). Hybridization, or merger, has the tendency to reduce or blur ethnic differences by recombining or replacing distinctive characteristics in parallel ways. Fission, or fragmentation, multiplies the number of ethnic groups by developing social networks and then impeding or regulating the exchange of people and information among them. A third process called juxtaposition involves the paradox of ethnic differentiation through interaction (Rodseth 2005:89). Juxtaposition is a creative process that reorders and revalues ethnic identity within a larger social context. Juxtaposition might be similar to fission in the way that it establishes a distinction between ethnic groups, but it is also like merger since it depends on the interaction between formerly separate groups. To illustrate this process, Lars Rodseth used German identity in the United States in which "German" depends on what it means to be "not-Irish", "not-Italian" and so forth. While fission separates ethnic groups, the development of German identity occurred by merging less comprehensives identities such as Bavarian, Saxon, or Hanoverian (Rodseth 2005:90).

Marcello Canuto and Ellen Bell, building on the work of Fredrik Barth (1969), argue that interaction between individuals who do not share any affiliation reinforce their differences. The creation of social groups is the consequence of group interaction such as the process of ethnogenesis, which is highlighted or accelerated in contexts of cultural contact. Boundaries are formed based on the negotiation of points of difference, and while ethnogenesis is often perceived as a slow process, it can occur quickly under proper circumstances (Canuto and Bell 2017:222). Lisa LeCount, in the study of Classic Maya ethnogenesis, used three cultural processes such as sustained interaction in which populations share material culture, religious ideology, and concepts of kinship. The second cultural process is practices of identities, in which polytheistic identities develop over time as overlapping symbols of political and social status emerged. The third cultural process is the hegemonic process in which state expansion is the result of differentiated cultural groups. While elite groups maintained cultural and political affiliations, they trigger local population through political aggression and subordination (LeCount 2017:175).

In the Andes, Richard Reycraft argues that environmental stress causes the incorporation of foreign styles by the Chiribaya people in the far south central coast of Peru. The presence of Estuquiña design in post-disaster Chiribaya pottery and its use in funerary contexts suggests that this new ceramic style was very important in ritual activities. In addition, the presence Estuquiña design on Chiribaya textiles and hats indicate a strong influence in post-disaster Chiribaya groups. These changes indicate that Chiribaya people expressed their ethnicity very differently from their ancestors. However, Estuquiña influence did not affect the form and design of domestic structures and tombs, which continued without changes. It is possible that architecture and tomb forms represent a more latent ethnic identity or that markers of social differentiation changes faster than other manifestations of ethnic identity (Reycraft 2005:66). Garth Bawden, at the site of Galindo (Moche Valley), observed that both the elite and commoners used different types of material symbols. The site of Galindo was occupied after El Niño events which occurred around the seventh century A.D. Bawden argues that the creation of new material symbols by the elite at Galindo was an attempt to separate themselves from past political failures and maintain their political status. On the other hand, commoners faced relocation and disruption of their kinship system and were motivated to re-establish their social identity. The construction of a new ethnic identity (ethnogenesis) was the result of a combination of innovation and conceptual continuity within residential practices (Bawden 2005:30).

In developing the differences between borders and frontiers, Bryan Feuer (2016) defined a border as the area in which a sedentary society extended from the boundary of its core zone to the limits of its effective political center. In addition, border zones were considered less integrated and developed, and more provincial than the center. But they were also areas where social innovation and change occurred. Frontiers, on the other hand, were areas where a society expanded or colonized, usually occupied by another society. The frontier also allowed interaction of groups in a variety of ways, and formed networks of social, political and economic communication connecting the center with the frontier to other more distant regions. Although Feuer established the difference between a border and a frontier, both were buffer zones. Political processes influenced the manner in which borders and frontiers were organized, and political boundaries were related to the control of a polity. The nature and enforcement of those boundaries varied according to contingencies such as distance, geography, and sociopolitical complexity. While the primary function of the boundary was to restrict and control movement, it was permeable, depending on the government, as well as other variables such as location, geography, nature of the boundaries, the number of resources used, movement and communication. The border was the limit of political control and jurisdiction, beyond which was the frontier. This was the land of the other and was characterized by low sociopolitical relations and the absence of laws. When political or military control was established in the frontier, it became a border. Borders tended to be less centralized than the core, but more centralized than the frontier. As the core polity became more complex and centralized, the border also changed, becoming more precisely define and more strongly enforced.

Social and cultural processes, as well as the close proximity among groups, promoted opportunity for cultural contact and exchange. This interaction was neutral, friendly or hostile and occurred in social, political, economic and ceremonial contexts. While anyone, in principle, could interact with another culture, some individuals and groups were more likely than others to do so. The periphery was most likely the area in which ethnogenesis occurred, the process of syncretization which resulted in a new identity. The movement or diffusion of things, ideas, and practices occurred as a result of migration or colonization. Another mechanism of diffusion was trade and long-distance exchange. Other way in which cultural transition occurred was through intermarriage practices that were common in peripheral areas where contact with other cultural groups was more common. In the case of patrilocal societies, the married woman moved to live with her husband's family and either adopted the cultural practices of her husband's family or maintained her culture and passed it on to others, especially her children.

CHAPTER FIVE:

ENVIRONMENTAL AND CULTURAL SETTING OF THE HUARMEY VALLEY

5.1 Geography

The Huarmey Valley is located on the north central coast of Peru, in the Ancash Region, 297 kilometers north of Lima (the Peruvian capital) (Figure 5.1). The coastal valley of Culebras is located to the north of Huarmey, while the Fortaleza Valley is located to the south. The area of the Huarmey Valley is situated between 9° 14’ and 10° 05’ south latitude, and 77° 28’ and 78° 24’ west longitude (ONERN 1972). It extends from sea level to 4,869 meters above sea level to where the Black Mountains separate the Huarmey and Santa Basin (INRENA 2007).

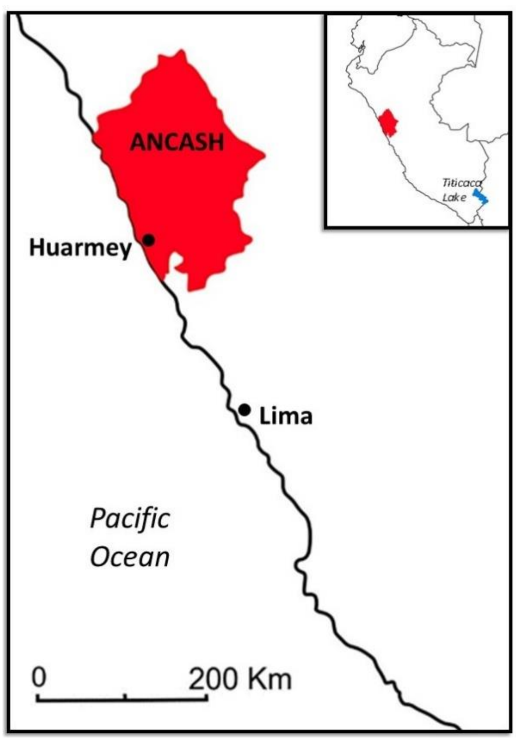

Figure 5.1: Geographical Location of Huarmey

5.2 The Huarmey Basin

The Huarmey River begins near the modern town of Huamba through the confluence of the Aija and Malvas rivers at an elevation of over 2000 meters (Figure 5.2). From this point the river descends 90 km into the Pacific Ocean (ONERN 1972). The water providing the Huarmey River is similar to other coastal rivers with high volumes of water between January and April followed by a dry period between June and November (INRENA 2007).

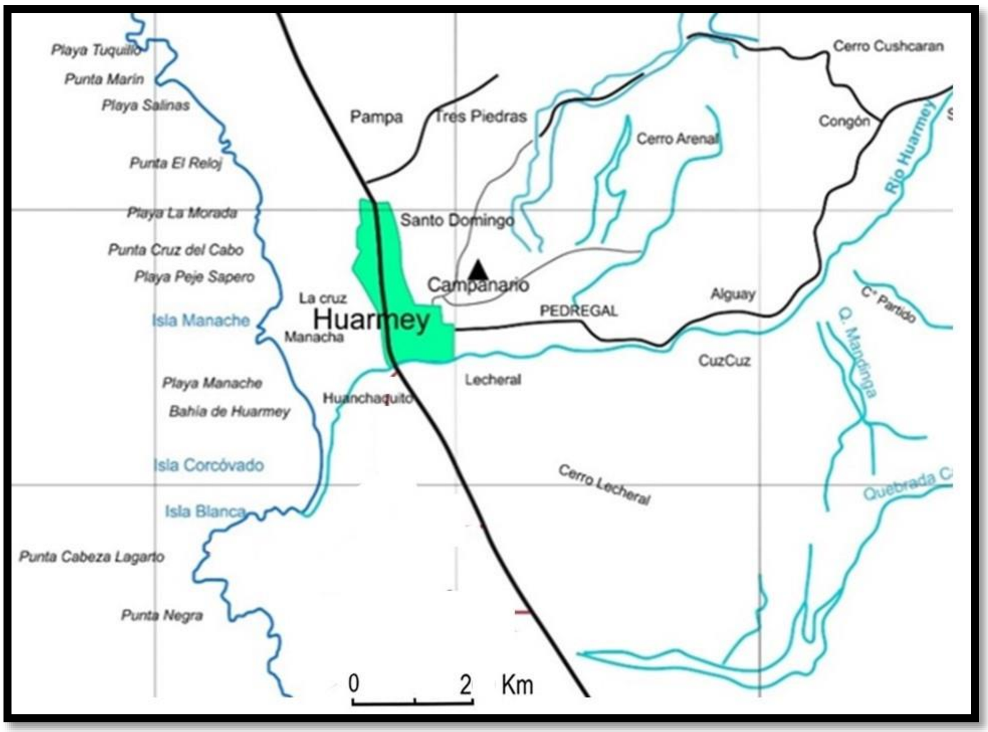

Figure 5.2: Huarmey Basin

The Huarmey River, like those in other coastal valleys, has an average annual discharge of 112.3 million cubic meters. The upper region of the Huarmey River has a significant number of lakes formed through rainfall. While these lakes are not suitable for regulating irrigation, they can be used for modern improvement of the farm land in the sierra sector (ONERN 1972). The Huarmey Basin encompasses 2,245 km^2 along with significant variation in the topography and, at more than 3,500 meters above sea level, the topography varies between 2 and 10% in slope

(INRENA 2007). The weather in the valley varies from warm and dry to humid and cold, with an annual low temperature of 22.05°C , a high temperature of 32.24°C during the summer months and 14.36°C during the winter months (INRENA 2007).

5.3 Geomorphology

The Huarmey River occupies a large basin of sedimentation, which has been the scene of successive sinking and emersions through its geological history, allowing the deposit of both marine and continental sediments. This basin covers 2,245 km^2, and is located geographically in the UTM WGS Zone 17, coordinates 809030E 8872176N (INRENA 2007).

At the edaphological (soil science) level, rocks emerging in the region are sedimentary, metamorphic, and igneous. The first group is mainly represented by limestone, shale, sandstone, and conglomerates of fine sediments with volcanic material. The second by quartzite, slate and marble, and the third mainly by intrusions of a granitoid composition of batholitic type and minor intrusions, as well as volcanic effusions that partially or completely cover structures and rocks. The age of these rocks ranges from the Upper Jurassic to the recent Quaternary (ONERN 1972). The soils in the Huarmey Valley are classified in flood areas, floodplain terraces, alluvial plains, alluvial fans, and mountainous areas.

5.3.1 Flood Areas

This group is located at the bottom of the valley and is it comprised of the river beds and marginal lands, which are exposed to periodic flooding. The presence of boulders and sandy material is very common in the areas of riverbeds and banks.

5.3.2 Floodplain Terraces

This class of soil is of variable texture and depth and some problems of drainage and salinity were detected although slight. The localities in the middle and lower~~s~~ Huarmey Valley such as Barbacay, Sonson, Chilcal, Gongon, Alguay, and Cuzcus contain soils that belong to this class.

5.3.3 Alluvial Plain

The soils of this formation have salinity and drainage problems, where the soil texture varies between medium and moderately fine. The localities in the lowers Huarmey Valley such as Arenal, Lecheral, Huarmey, and Manache contain soils that belong to this class.

5.3.4 Alluvial Fans

The soils located in areas adjacent to the orogenic formations that border the landscape of the valley. The soils are of variable texture and depth with the predominance of the thick element, although it has also been possible to place medium-textured soils on a small scale.

5.3.5 Mountainous Areas.

This class of soil includes all those residual soils of lithic nature.

5.4 Hydrography

The Huarmey River belongs to the Pacific hydrographic system. It is born in the heights of the Utato, Toco, Shiquish and Murpa lagoons, at an elevation of 4,600 meters, feeding its water source with precipitation that falls in the heights of the western flank of the Cordillera Negra. It is born with the name of Huayup, keeping this name until the confluence with the Yanapavín River, where it adopts the name of Huarmey. At this point the topography changes: on the right bank the ravine of Pillac, and on the left bank the streams of Hulihuran and Huayán (ONERN 1972).

5.5 Ecology

The subdivision of the Huarmey Valley in ecological zones was elaborated based on bio-temperature, rainfall, evaporation and elevations (INRENA2007). The Huarmey Basin contains thirteen ecological zones of which eleven are included in the Tropical Region while the remaining two are in the Subtropical Region.

5.5.1 Desert Desiccated Sub-Tropical

This is located on the coast of the Costa region and covers a surface area of 273.5 km^2. It has a desiccated semi-warm desert climate, an average annual temperature between 18 °C and 19 °C, and an average annual total rainfall between 15-30 mm. It shows a null or sparse vegetation cover, and is dominated by a blanket of sand. There is agricultural activity only at the level of the valleys, where water is available for irrigation.

5.5.2 Desert Pre-Arid Montano Bajo Subtropical

This is located between 1,000 and 2,000 meters above sea level, on the slopes of the foothills of the Andes Mountains or looking towards the coast. It covers a surface area of 74.4 km^2 and has a warm temperate pre-arid climate, an annual average temperature between 13-15 °C and an annual rainfall of 60-120 mm. Vegetation cover is scarce, but during the summer season, rains produce ephemeral herbs associated with shrub vegetation as well as cactus.

5.5.3 Desert Super-Arid Pre-Montano

This covers a surface area of 446.1 km^2. It has an arid, semi-warm desert climate, an annual average temperature of 19-20 °C and annual precipitation of 30-60 mm. It has a very dispersed vegetation, shrubs, xerophytic and seasonal plants, which emerge in winter with moisture produced by mists. Agricultural activity takes place in the river valleys that cross the life zone.

5.5.4 Pre-Arid Desert Pre-Montano

This covers an area of 326.8 km^2. It has a pre-arid semi-warm desert climate, with an average annual temperature of 20-21 °C and annual precipitation between 60-125 mm. It shows vegetation of grasses and cacti and little agricultural activity.

5.5.5 Desert Pre-Arid Montano Bajo Tropical

This is located between 2,000 and 2,500 meters above sea level in the western foothills of the Cordillera de los Andes. It covers an area of 48.8 km^2 and has a warm, mountain pre-arid climate with an annual temperature of 13-19 °C. It shows annual precipitation of 60-120 mm and produces scarce vegetation during the periods of summer rains, where ephemeral herbs emerge associated with shrub and cacti vegetation.

5.5.6 Tropical Montano Desert

This is located over the pre-arid desert Montano Bajo and Montano Bajo desert scrub, between 1,500 and 2,500 meters above sea level and covers an area of 3.8 km^2. It has an arid, cold temperate climate, with annual temperature between 8-12 °C; It shows an annual precipitation of

90-125mm and produces vegetation of cactus, herbaceous and shrubby. It has grazing of little value for agricultural development.

5.5.7 Desert Scrub Low Montano

This is located between 2,500 and 3,000 meters above sea level in the western foothills of the Andes Mountains. It has an area of 149.0 km^2 and an arid, warm temperate climate, with temperatures between 14-19 °C. It shows annual precipitation of 125-250 mm and seasonal vegetation that emerges with the arrival of summer rains, associated with perennial shrubs.

5.5.8 Desert Tropical Pre-Montano Scrub

This is located on the coast, in the foothills of the Western Andes, and at the bottom of coastal river valleys. It covers an area of 89.50 km^2 and has a semi-warm arid climate, with annual temperatures between 19-20 °C. It shows annual precipitation between 140-260 mm. With respect to vegetation, it has seasonal grasses, shrubs and giant cacti of the genus Neoraimondia, characteristic of this zone of life. Agricultural activity is framed in small areas that have irrigated water, where vegetables, fruits such as peaches, prickly pears and apples are grown.

5.5.9 Thorny Steppe

This is located between the valleys of the western slope, 2,000-3,000 meters above sea level in the Sierra region. It has a surface area of 48.90 km^2. A warm temperate semi-arid climate is registered, with annual temperatures between 12-17 °C. It shows rainfall of 250-450 mm per year, and has herbaceous vegetation associated with shrubs, such as the viscid Chamana Donodea, trees, such as molle *Schimus molle*, and cacti, as well as very dynamic agriculture.

5.5.10 Tropical Montane Steppe

This zone is located on the thorny steppe, between 3,000 and 4,000 meters above sea level, in the region of the sierra. It has a surface area of 266.30 km^2 and a cold, temperate, subhumid climate, with annual temperatures between 7-12 °C and annual precipitation of 350-500 mm. It has grass vegetation typical of the high Andean prairie, i.e., cacti of the Opuntia genus and cultivated cereal crops such as barley.

5.5.11 Tropical Subalpine Wetlands

This is located on the Montano steppe between 3,900 and 4,200 meters above sea level, in the Sierra region and covers a surface area of 392.20 km^2. It has a cold humid climate, with an annual average temperature of 4-6 °C, and total rainfall of 450-550 mm. Vegetation is Andean high grassland consisting of natural grasses of the Opuntia genus, as well as bushes and arboreal species of the genus Polylepis (quinual). These areas have grazing land for sheep and cattle, also suitable for raising camelid livestock.

5.5.12 Tropical Alpine Very Humid Tundra

This is located on the humid subalpine moor between 4,500 and 5,000 meters above sea level in the sierra region. It covers a surface area of 124.00 km^2 and has a very cold pre-humid climate, with an annual average temperature of 3-15 °C and an average precipitation of 400-500 mm. Some vegetation kills high, dispersed Andean natural grasses, areas used for seasonal transhumance grazing of camelids.

5.5.13 Very Humid Subalpine Tropical Paramo

This is located on the humid páramo on the 4,200 and 4,500 meters above sea level and covers an area of 1.7 km^2. It has a cold pre-humid climate, with temperatures between 3 and 6 °C and an annual rainfall between 600 and 800 mm. It shows high-Andean prairie vegetation of natural grasses for grazing of camelids.

5.6 Climate

The climate in the basin of the Huarmey River, because of the Humboldt current and the South Pacific anticyclone, varies from warm to very dry (desiccated to semi-warm). On the coast, the climate is cold and humid, with average annual temperatures between 18° and 3 °C. Climate levels here have been identified: semi-warm, temperate-sub-humid and cold-temperate (INRENA 2007: 20).

5.7 Flora and fauna

The floral environment that surrounds El Campanario is made up of grasses such as "grama salada" (*Distichlis spicata and salicornia* sp), "huarango" (*Acasia* sp), "algarrobo" (*Prosopis* sp), "molle" (*Schimus molle*), "sauce" (*Salix* sp), "gigantón" (*Cereus macrostibas*), "candelabro" (*Acacia macracantha*), "taro" (*Caesalpinea tinctoria*), "caricillo" (*Phragmites australis*), "carrizo" (*Arundo donax*), "caña brava" (*Gynerium saggitatum*), "pájaro bobo" (*Tessaria integrifolia*), "guayaba" (*Psidium guajava*), "palta" (*Persea americana*), "calabaza" (*Lagenaria siceraria*). Fauna have been registered as "lobo marino de un pelo" (*Otaria flavescens*) and "lobo marino de dos pelos" (*Arthocephalus australis*), "pardelas" (*Puffinesten virrostris*), "guanay"

(*Phalacrocorax bougainville*), "gallinazo" (*Mimuslongicaudatus*), "lechuza" (*Glaucidium peruanum*).

5.8 Geology

Information on geological zones in the Huarmey Valley was obtained from the Peruvian Geology Institute (abbreviated INGEMMET in Spanish) as part of its reports on the impact of the El Niño phenomenon in Huarmey in 2017 (Figure 5.3), the Geology Institute (1980), and the Institute of Natural Recourses (2002).

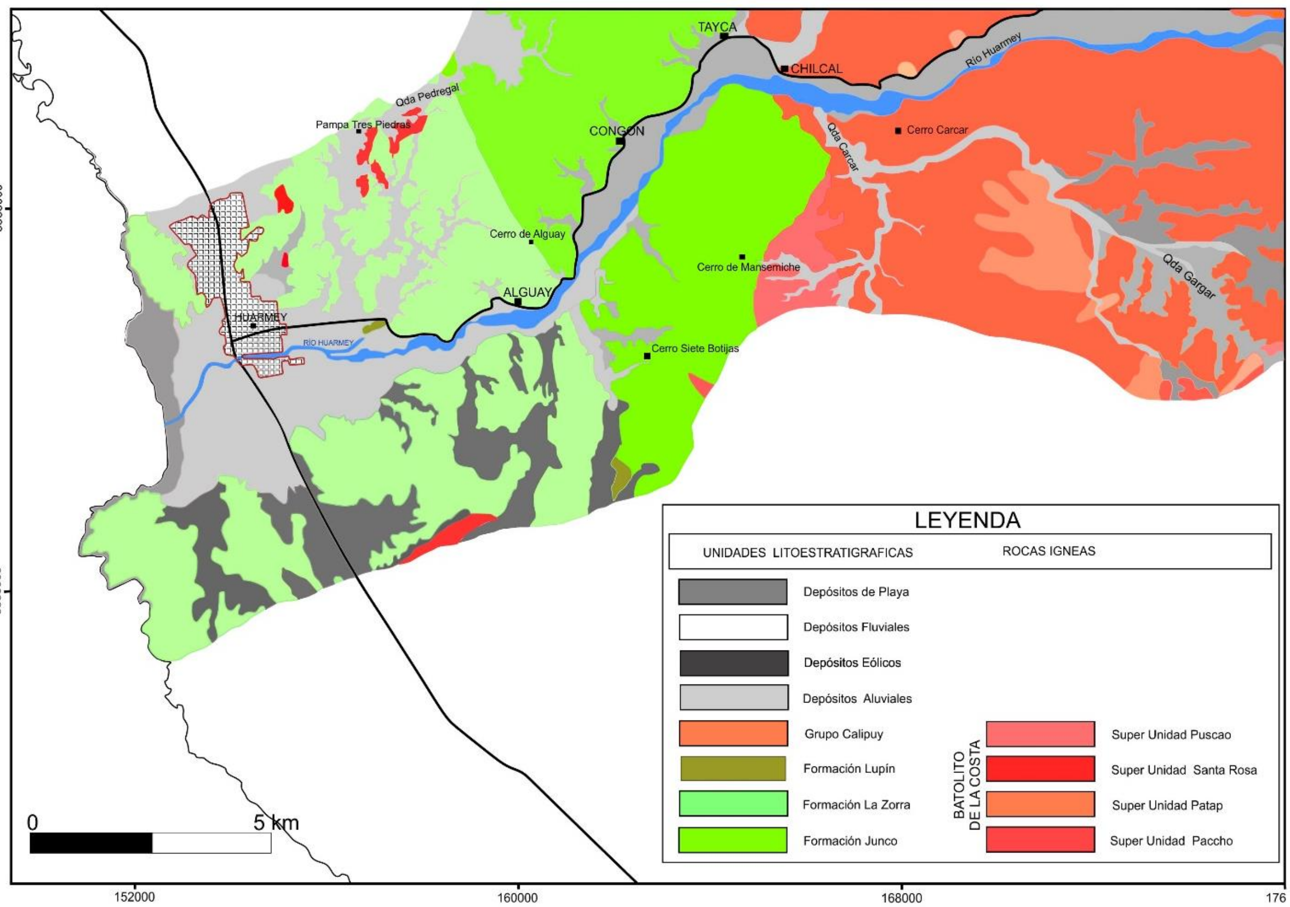

Figure 5.3: Huarmey Valley Geological Map (Adapted from INGEMMET 2007)

5.8.1 Junco Formation (Lower Cretaceous)

This formation shows lava pads interspersed with agglomerates; it also shows a dark gray to greenish. The factors of the metamorphisms that have acted on rocks of the Junco formation are related to temperature, which increases remarkably due to the location of major and minor intrusive bodies. This formation emerges in the middle and lower part of the Huarmey Valley near the towns of Tayca and Huayup.

5.8.2 La Zorra Formation (Lower Cretaceous)

This formation surfaces in extensive areas on both sides of the Batolito de la Costa. It consists of up to 1,800 meters of flows and sills of andesite, dacitic ignimbrites, tufts, agglomerates and submarine pyroclastic flows. Within the formation, there are four predominant units of thick pyroclastics that have been mapped and classified as members, the same ones that appear in a lenticular form.

The most abundant rocks of the La Zorra formation are andesitic lavas that are generally less than 10 meters thick and show well-developed columnar junctures. Many flows have gaps in the base and vesicles in the upper portions. Typically, the flows are porphyritic and hialopilitic, with undescended andesine phenocrysts up to 2.5mm in length and, in smaller quantities, clinopiroxene twinned, pale green in color.

The phenocrysts are within a matrix of trachytic texture, holocrystalline, composed of crystals of andesine, clinopyroxene twinned, pale green, hornblende green to ilmenite, showing smaller amounts of quartz in the interstices. Many flows have been palagonized and the matrix altered to chlorite and clonozoisite appearing calcite remains and some epidote. Some lavas are glassy, with flow banding, which in many cases have been irregularly contorted.

5.8.3 Lupin Formation (Upper Cretaceous)

The Lupín formation emerges on both sides of the Batolito Costanero and consists of 1,800 meters of padded lavas and breaches thereof, with subordinate quantities of tufts. It is in compliance with the Breas training, from which it passes in a gradational manner. The base of the formation is located where the lava in the pad becomes dominant on the chert.

The formation consists of thick, massive units of padded lavas and equal amounts of gap of the same material, interspersed with thinner units of hydro-deposited tuff. The lava hills are parallel to the coastline and the Andes Mountain Range. Pillow lava shows an increasing gap to the north, suggesting a steeper seabed in that part of the region at the time of the eruption.

5.8.4 Calipuy Group (Eocene-Miocene)

This consists of a thick sequence of andesitic and dacitic lava, as well as flows of tufáceo agglomerates. Two flows of dacite with fragments of glass and rock are found near the base of the sequence and are the two thickest units. Most of the lava flows are of andesite porphyritic to plagioclase, with oscillatory zonation, and some clinopyroxene phenocrysts. Plagioclase is partially altered while pyroxene is strongly altered to chlorite, mica and epidote.

5.8.5 Intrusive Rocks

Among the towns of Tayca, Chilcal, Barbacay, Malpaso and Huamba there are a group of intrusive rocks which are related to the Batolito de la Costa. These rocks are mostly quite homogeneous dark Tonalites that have the texture of a common mineral arrangement with some variations to granodiorite. Many deposits are covered by sand; also, many of these rocks have been cut by volcanic intrusions of the Casma group. The batolito is observed on the eastern flank of the large hill, Tortuga and Santa Cristina. These rocks are quite compact, and by consequence, impervious to the flow of underground water.

5.8.6 Alluvial Deposits

These are classic accumulations, formed by sands, clays, silts, gravels and edges with inclusions of blocks, intermingled in different proportions, having been deposited under very variable conditions. These deposits constitute the agricultural area of the valley, located along the river and on the slopes of the Huarmey valley, forming the filling of the channel and the terraces of variable extensions and thicknesses. Sediments that make up the plain are classified as ridges, gravels and clay-silts; the edges have sub-rounded to rounded shapes and are of varied composition. They form terraces that reach between 0.80 and 58.50 meters above the current level of the river.

5.8.7 Wind Deposits

These are deposits of fine-grained sands that cover much of the alluvial areas and older rock formations. These deposits are presented in the form of proper mantles, or dunes, and are not important for prospecting and exploitation of groundwater.

5.8.8 Marine Deposits

These deposits do not have major incidence in the hydrogeology of the area due to their marginal character. They constitute a strip of sand and very narrow ridges located along the coast, and related to the emergence of coastal escarpments. In the Huarmey Valley, on the beaches of Punta Salinas, marine terraces of 1.00 to 1.50m thick and up to 12km long have been found, showing abundant remains of shells and crusts of salt on the surface, the latter being quaternary Marine.

5.9 Cultural Development in the Huarmey Valley

The Huarmey Valley is one of the Peruvian coastal valleys that has been poorly investigated, taking into consideration the significant evidence of pre-Hispanic occupations. Historical information suggests that the name of valley came from the Quechua word *Huarmy*, which means *woman*. During the Late Horizon the Inca Pachacutec incorporated it after several battles, and continued later to the northern valleys of Casma and Santa (Antunez de Mayolo 1990). During the nineteenth century, brief descriptions of the Huarmey valley were reported by early travelers such as Raimondi (1973), and Squier (1977). Antonio Raimondi described Huarmey as an isolated town which relied on their cove for economic activities. Agriculture activities are limited since the water supply of the Huarmey River comes only during 5 or 6 months each year. Raimondi also reported houses built using the wattle and daub technique (Raimondi 1973:144-145). George Squier visited the port of Huarmey during his trip from Lima to Trujillo and described the port as a collection of huts distinguished by their *chicha* production (Squier 1977:103).

5.9.1 Preceramic

There is little information related to the preceramic occupation of the Huarmey Valley. The earliest evidence of human occupation is associated with small campsites containing evidence of lithic flakes (Bonavia 1980). In addition, there were several preceramic middens along the shore line. These middens contained remains of vegetables and marine resources, but without evidence of ceramic remains. Neither is there evidence of architecture in the middens and accumulation of trash deposits was associated with extraction and consumption of marine resources (Tabio 1977).

One of the most important preceramic sites in Huarmey is Los Gavilanes, excavated by Duccio Bonavia (1982). This site contained storage pits with large quantities of maize. The pits were irregular in form and they ranged from two to twenty-four meters in diameter. Within these pits were more food remains, indicating that the site was used as a seasonally occupied storage area.

5.9.2 Initial Period

The site of Mandinga is associated with the Initial Period and was studied by Alcides Alvarez and Juan Espinosa. The site is located on the left side of the Huarmey Valley, approximately 12 kilometers from the shoreline. It is composed of three platforms of stone and mud built at different levels, one on top of another. The construction technique at Mandinga consisted of fixing large rectangular stones together with mud, surrounded by small stones. In addition, there was a sunken circular plaza of 20 meters in diameter and 9 meters deep in one of the three platforms. According to Alcides Alvarez and Juan Espinosa, the site of Mandinga followed the same layout and construction techniques as the site of Las Aldas in the Casma Valley (Alvarez and Espinosa 1997:42).

5.9.3 Early Horizon

There are several sites associated with this period located along the Huarmey Valley, from five kilometers off the shoreline to fifty kilometers inland. The ceramic style associated with the Early Horizon is called Huamba and combines Chavin and local styles (Tabio 1977). Thompson

(1966) separated the Huamba style into Huamba Red Plain and Huamba Decorated. Huamba Red Plain is a fired red pottery with a range of color. The exterior surface is smoother and sometimes polished with a pebble or softer instrument which left shallow grooves. The Huamba Decorated shows broad line incisions and reed punctuations on the vessel's surface (Thompson 1966: 543).

Furthermore, Thompson (1966) suggested that the Huamba site shared similarities with the Paklla site in the Casma Valley. In addition, Huamba ceramics resemble the Patazca ceramic style, also from the Casma Valley, and the masonry style is also similar to other Early Horizon sites in the Casma area. Finally, the Huamba ceramic and masonry styles are also similar to sites found in the Fortaleza Valley.

Aiguay ceramic, which is characterized by thick walls and negative painted decoration, according to Thompson, is associated with the end of the Early Horizon. This ceramic style is associated with that of the Pedregal site that shares architectural similarities with sites in the Casma Valley. However, Ernesto Tabio (1977) believed that the Aiguay style belonged to the Early Intermediate Period.

5.9.4 Early Intermediate Period

There is limited information about this cultural period in the Huarmey Valley and only a couple of sites have been associated with this period. Highland ceramic styles, such as Recuay (Tabio 1977) and Wilkawain (Bennett 1944) have been found in the middle and upper parts of the valley.

In the lower Huarmey Valley, the site of Cerro Aiguay is associated with an Early Intermediate Period occupation. The site is surrounded by large stone walls, possibly built for defensive purposes. In addition, the site contains a series of platforms that were probably a house's foundation. The ceramic style found at the site was Aiguay Negative decoration, which share similarities which the Gallinazo style of the Viru Valley (Bonavia 1982; Tabio 1977).

Donald Thompson (1966) suggests that this valley was abandoned during this time period, or that perhaps there was a simple rural culture that continued occupying the valley after the decline of the Early Horizon.

5.9.5 Middle Horizon

During this period the Huarmey Valley experienced an increase in what are now archaeological sites due to population growth. At the beginning of the Middle Horizon, cultural influences from the highland and central coast of Peru were introduced into the Huarmey Valley (Tabio 1977). Archeological sites related to this period are relatively small in relation to other large coastal sites (Tabio 1977; Thompson 1966). Thompson (1966) also observed that the Middle Horizon began with the introduction of fine polychrome pottery, later replaced by black-white-red painted pottery.

There was also an effort to build adobe pyramidal structures on top of or on spurs of hills. In sites with terraces, perhaps related to the Middle Horizon epoch 3, maize cobs were used as filling material in the construction of the walls. Construction materials used during this period were mold-made abode brick and *tapia* adobes (Tabio 1977; Thompson 1966).

Ernesto Tabio (1977) divided the ceramic style of the Middle Horizon into three phases. The early phase is represented by the Huarmey-Pachacamac, which shows influence not only of central coastal styles but also from the highland, such as the Conchopata style. The middle phase is characterized by five distinctive styles. The first is Huarmey Mochica-Huari, a combination of Mochica-like and Tiwanaku influence (Tabio 1977:130). In some cases, ceramic vessels were redware decorated with effigies, and in other cases were painted or press decorated. The second style is the Huarmey Norteno B, represented by a single redware ceramic vessels. The third ceramic style is the Huarmey-Santa, which has polychrome decoration. The most common vessel is a bottle with a short neck, decorated with human faces or a checkboard design in black and white. Other forms included the *kero* cup, decorated with white and black painting on a red-orange surface. Some ceramics combined polychrome with press-molded decoration (Tabio 1977: 132).

Another style is the Huarmey *Impreso*, very common in the valley. These vessels are mostly redware, produced by using molds; the most common form are the bottles with short necks and pedestal bowls with simple decoration, unlike the Huarmey-Santa style. The Huarmey *Impreso* also had Wari influences, with some vessels depicting supernatural individuals with maize cobs, interpreted as a maize deity. Other decorative designs were related to fertility rites, such as the depiction of a human couple copulating (Tabio 1977: 135). The last ceramic style of this middle phase was Huarmey *Inciso*, similar to the ceramic style found in the Casma Valley, denominated by Collier (1960) as Casma *Inciso*. In the Huarmey Valley, Huarmey *Inciso* was the most common style of ceramic found at each site. Huarmey *Inciso* was mostly redware ceramic, the most common form being the *olla* with vertical handles (Tabio 1977:137). Another decoration depicted consisted in zoomorphic applications on various areas of the ceramic vessel. The late phase of the Middle Horizon, according to Ernesto Tabio (1977) is also related to Huarmey *Inciso* which moved from redware to blackware in the late stages of the period and continued into the Late Intermediate Period and Late Horizon.

Richard Schaedel in his study of the distribution of Wari ceramic and other highland styles into the North Coast of Peru suggests that the east-west corridor of Wari diffusion occurred through Jequetepeque and Zaña Valleys. The second node existed probably between the south bank of the

Santa and Huarmey Rivers. A final east-west corridor could had existed in the Piura Region (Schaedel 1993: 230-231).

Between 1985 and 1986, Heiko Prümers conducted archaeological surveys in the lower Huarmey Valley, specifically at the site of El Castillo de Huarmey. Surface materials recovered at El Castillo de Huarmey consisted of pottery sherds, textiles and gourd fragments. According to Prümers, from a total of 1600 pottery sherds, about ninety percent consisted of local molded ceramic decoration. The remaining ceramic styles were composed of classic Wari styles, Nasca Phase 9 style, Moche style, Huari Norteño style (related to the Middle Horizon 3 and 4), Cajamarca style, and Sican Medio style (Prümers 2000: 295). The presence of various ceramic styles at El Castillo de Huarmey allowed Prümers to hypothesize contact with other cultural regions, such as Ayacucho and Nazca in the southern region of Peru, as well as relations with societies on the north coast. Plumers also noticed that the molded ceramic decoration showed influences from the styles of the north coast of Peru, and it is possible that molded ceramic decoration was not restricted to the Middle Horizon. Analysis of the textiles (521 fragments), on the other hand, showed that approximately ninety-five percent were associated with Huari-Moche style, most likely produced locally within the Huarmey Valley. The other styles identified on textiles were related to classic Wari styles, Nazca Phase 9 and Sican Medio.

Recent archaeological research conducted at the site of El Castillo de Huarmey demonstrated the presence of Wari material culture in the valley. This site was considered a provincial center of the Wari Empire, which occupied this valley between 800 and 1000 AD (Giersz 2014; Giersz and Makowski 2014). The burial complex at El Castillo consisted of a series of chambers associated with the main building, which followed patterns similar to those of the Huari site. The site was used exclusively by local elite, which reinforced their power through the construction of monumental architecture (Giersz and Malinowski 2014:67). Besides the construction of the monumental structure a funerary structure of various layers similar to *chullpas* was built on top of a rocky hill. The funerary structure contained fifty-eight noble women which were individually wrapped with textiles and offerings placed above the textiles (Giersz 2014:85-91). These noble women were buried along with six adolescents which were possibly sacrifice sin they did not have textiles or offerings (Giersz 2016:244).

The Middle Horizon in the Huarmey Valley was associated with changes in ceramic production, in which press-molded decoration (redware and blackware) was established as a new local ceramic tradition along with the introduction of new vessels forms, such as the *kero* or ceremonial cup. The presence of local pottery, along with foreign Wari pottery, in the context suggested the presence of imported pottery as well as the local imitation of Wari pottery due to the new exchange system established by the elite (Giersz and Malinowski 2014:66).

5.9.6 Late Intermediate Period

The Chimú ceramic style that characterized the Late Intermediate Period appeared in the Huarmey Valley at the end of this period. It is possible, according to Tabio, that the inhabitants of the Huarmey Valley continued the use of ceramic styles from the Middle Horizon, along with other local styles such as Huarmey *Inciso* and Huarmey *Impreso* (Tabio 1977:140). One archaeological site related to this period is located near the Port of Huarmey, described by Donald Thompson (1967). Remains of the walls suggested the presence of small terraces similar in style to those at Paramonga in the Fortaleza Valley. The construction technique at the site consisted of *tapia* (rammed earth) constructed in large blocks, and surface ceramic recovered at the site was related to Chimú and Chimú-Inca styles. This site was possibly a Chimú outpost in the Huarmey Valley and later reoccupied by the Incas (Thompson 1967: 116).

According to Ernesto Tabio (1977) early Chimú phases are absent in the Huarmey Valley. The Huarmey-Chimú style appeared at the end of the Late Intermediate Period. The ceramic of this period was blackware, and the most typical vessel form was the double chamber with a bridged spout as well as the stirrup-spout bottle. Tabio also observed the presence of Chancay Negro/Blanco style in two ceramic vessels of a private collection that were supposedly collected from a cemetery near the port of Huarmey.

The study of human remains at the site of Punta Lobos shows that the sacrifice of several individuals was contemporaneous with Chimú expansion to the south (Verano and Toyne 2011). There were 108 male individuals placed face down with their hands and feet bound. In addition, the textiles associated with these individuals indicated that they were embellished according to coastal traditions, and the manufacturing techniques were related to the Late Intermediate Period (A.D. 1000-1470). This massive sacrifice of male individuals was interpreted as a way to intimidate local population in the Huarmey Valley. Radiocarbon dates place sacrificial events between A.D 1250 and 1300 and related to the Chimú conquest of the valley. This massive sacrifice was a Chimú response to local resistance (Verano and Toyne 2011).

5.9.7 Late Horizon

Inca occupation during the Late Horizon was identified by the combination of Inca aryballos shape and typical mold-made blackware (Thompson 1964: 545). In the discussion of the Inca occupation in Huarmey, Thompson referred to one colonial *visita* of 1593 conducted by Don Toribio Alfonso de Mogrovejo in which he wrote that the people in the town of Huarmey did not speak Quechua (the Inca language) but instead spoke the Yunga language. There is no doubt that the Inca territory included the Huarmey Valley, but apparently, they did not occupy it with the intensity that characterized Inca presence in other Andean valleys.

5.10 El Niño Phenomenon

El Niño-Southern Oscillation (ENSO) is a natural climatic event that takes place in the central equatorial Pacific. During the warm phase of El Niño, the sea surface temperature rises, and the easterly winds become weaker than average on the eastern side of the Pacific Ocean. These anomalous conditions generate strong rainfalls and changes in the weather and fisheries in the countries near the South Eastern Pacific, as well as in other parts of the world (Maturana *et al.* 2004:13-14). The term *El Niño* is commonly associated with large-scale warming that occurs every few years and changes local and regional ecological conditions (Stenseth *et al.* 2003:2087). The changes in the temperature of the ocean from cold to warm results in constant precipitation on the arid coast, along with rapid decline of species that normally live in the sea. In addition, extensive rainfall causes flooding which, in extreme circumstances, can destroy houses, roads, and agricultural fields (Van Buren 2001). In 2017, the impact of El Niño lasted three months in Peru, affecting around 1.5 million Peruvians and causing the destruction of thousands of houses (ISET 2017).

El Niño events have been recorded since Spanish *conquistadores* entered the Andean Region. Based on available documents, information on significant climatic changes in the coastal region of South America has allowed meteorologists to identify various levels of intensity of El Niño events (Quinn and Neal 1987). The presence of El Niño events in pre-Hispanic times have been identified through the studies of ice core, sediments, and variations in fauna and flora that may indicate changes in climatic conditions in the past. The presence of various species of mollusks in archaeological sites along coastal Peru are commonly used to infer coastal environmental conditions. Some mollusk species are more sensitive to warm sea water temperatures, and the presence or absence of those species can be used as markers of El Niño events. Some archaeological sites that date back to the Pre-Ceramic and Initial Periods contain evidence of periods of stable conditions as well as El Niño events and are also associated with periods of significant cultural changes. During these early cultural periods, the Peruvian coast between the Lambayeque Valley on the northern region of Peru to the Lurin Valley on the south (approximately 800 kilometers), the onset of El Niño was related to the construction of large and complex sites with monumental architecture. To the contrary, constant precipitation and flooding during El Niño events were, in most cases, related to the abandonment of the same monumental structures. However, there were a few sites, such as Manchay Bajo (Lurin valley) show evidence of El Niño mitigation through the construction of a large walls protecting the main temple from mud slides (Sandweiss *et al.* 2001:605).

Archaeological research at the site of Huaca de Luna also shows evidence of El Niño events during the Early Intermediate Period. Various sediments resulting from intense rainfall were found at the temple of Huaca de la Luna, dating around A.D. 600 (Bawden 1996; Uceda and Canziani 1993). The dramatic environmental changes along the north coast of Peru, along with internal stress in the Moche society, contributed to the collapse of the Moche sites in the southern territories of the north coast of Peru (Bawden 1996; Bourget 2001).

Records of El Niño events show an anomalous period related to weak El Niño activities between A.D. 800 and A.D. 1250 (Rein *et al.* 2005). This period was marked by severe drought without strong flooding events, and most of the mega-floods associated with El Niño events occurred before or after this anomalous period (Rein *et al.* 2004). After this anomalous period, a major flood occurred around the thirteenth century which is related to the decline of the Lambayeque Polity along with the expansion and incorporation by the Chimú Polity of the Moche Valley (Wells 1990). Another El Niño event recorded around A.D. 1100 was associated with a major flood episode affecting coastal population and triggering destruction of the monumental architecture of the Middle Sican Period (A.D. 900-1100) through a series of burning activities (Jennings 2008; Shimada 2000).

Historical and archaeological research of El Niño episodes demonstrated their impact on coastal societies over time. These climatic events were also associated with drastic cultural changes which transformed religious practices in the Sican Culture and triggered the imperial expansion of the Chimú Polity. The development of the Casma culture occurred during a period of the El Niño anomaly (A.D. 800 - 1250), characterized by a low intensity of El Niño events along with periods of droughts. However, the mega flood that affected the Sican Culture in A.D. 1100 may have impacted other areas along the northern coast, including the Casma and Huarmey Valleys.

The excavations at the domestic areas at El Campanario revealed the presence of a clay layer above adobe architecture at some of the units which could had been related to rainfall episodes or mud slides. The earliest date at El Campanario is associated within the first century of the Late Intermediate Period until A.D. 1280 when El Niño floods began affecting the Peruvian coast.

CHAPTER SIX:

ARCHAEOLOGICAL RESEARCH AT EL CAMPANARIO SITE

6.1 Site Location

The archaeological site of El Campanario is located to the north-east of the modern city of Huarmey and on the right bank of the Huarmey River. The Culebras Valley is located to the north and the Fortaleza Valley to the south. El Campanario site contains evidence of pre-Hispanic occupation such as mud brick walls, stone architecture, pottery sherds, stone tools, organic remains, and human remains which are most commonly found on the surface.

6.2 Previous Research at El Campanario

The first description of El Campanario was provided by Ernesto Tabio (1977) who was conducting a survey in the Huarmey Valley. The site contain a main structure or huaca built with small rectangular adobes on top of hilltop. This huaca has circular structures or storerooms of about three meters of diameter (Figure 6.1). Ernesto Tabio also subdivide El Campanario in two additional sectors. Sector H50-A which is located 100 meters south-east of the main huaca and contain burials which were built with rectangular adobes. Based on the ceramic the cemetery belong to the late phases of the Middle Horizon that extends to the Late Intermediate Period. The sector H50-B is composed for large terraces and structures situated on the northern hillside of a rocky outcrop and a few meters from the modern cemetery. In addition, on the hillside there are two rectangular unit and one of them has an area of 130 x 130 meters. Another structure describe by Ernesto Tabio is located to 250 meters to the west and has a rectangular area along with a circular structure on the northern end (Tabio 1977:119).

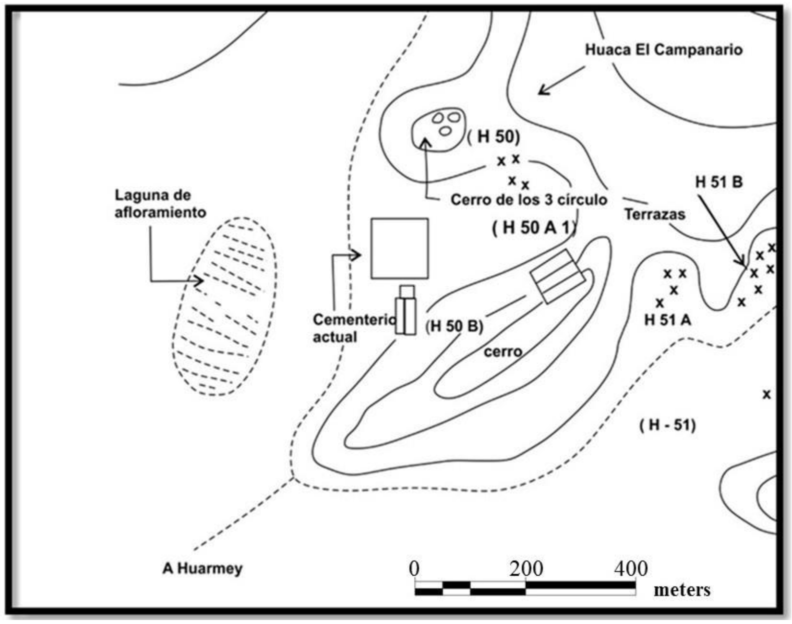

Figure 6.1 Drawing of El Campanario Site (adapted from Tabio 1977)

Duccio Bonavia (1982) mention that El Campanario contained complex and organized architecture along with trash deposits and a cemetery. Bonavia also observed that the site contain various subdivisions which probably were built in different time periods. The prehispanic cemetery is located to the east of the modern-day cemetery and it is possible that was used during the Middle Horizon and Late Intermediate Period. Bonavia also observed adobe structures on the east side of the cemetery and a fortified hilltop on the nor-west. Bonavia assigned the occupation of the site to the Middle Horizon and Late Intermediate Period (Chimú) and possibly a Late Horizon occupation (Bonavia 1982:439).

William Conklin (1979) in his study of Moche textiles describe a textile fragment from the Amano Museum in Lima which was found at the site of El Campanario. This textile is composed of cotton and wool. Only part of the textile shows modular banding which depict a warrior with a diagonal staff and many animated appearances. Conklin suggested that El Campanario was an important southern center of Moche influence during the Middle Horizon (Conklin 1979:168).

More recently, El Campanario site was studied by Enrique Zavaleta and Rocio Sanchez in order to establish the chronology of the site. This study was based in surface ceramic collection and the standing architecture visible on the surface. According to Zavaleta and Sanchez (2013) El Campanario is associated to the Casma ceramic style and it was an administrative and religious center which dominated the Huarmey Valley during the Late Intermediate Period (A.D. 1000). The socioeconomic importance of El Campanario increased after the decline of El Castillo de Huarmey (Middle Horizon). Zavaleta and Sanchez divided El Campanario in five sectors: the platform is located above a rocky outcrop and it is surrounded by three walls. In addition, there was evidence of decorated walls in which a serpent or stingray design were elaborated with mud. On the west side of the platform there is a plaza along with funerary chambers which were damage by looters. The administrative sector is located to the south area of the site and it is composed by a series of terraces. On the top end of the terraces are small platforms which were built using stones. Other terraces do not show any evidence of architecture on the surface. The urban sector 1 is composed by rooms, patios, plazas and corridors built in abode and stone. In most cases, stones are use as the foundation of the adobe walls. The material and fine architecture suggests that elite groups lived in this sector (Zavaleta and Sanchez 2013:140). The urban area 2 is located next to the platform and was built using rectangular adobes. In addition, there are various enclosures a long with evidence of yellow, red and white painting over the walls. Some *tapia* walls were also observed and they might be related to the last occupation of the site. The last sector is the storage structure which is located next to the modern cemetery. This is a rectangular structure in which two rows of storage units were built and they were separated by a central corridor. Finally, Zavaleta and Sanchez also reported the presence of a cemetery on the south side of the modern cemetery. Besides the presence of Casma sherds, Zavaleta and Sanchez recovered fragments of painted pottery sherds which do not follow traditional Casma styles and this decoration was a stylistic continuity from the Middle Horizon (Zavaleta and Sanchez 2013:160).

In 2018, Jorge Eduardo Eche Vega excavated Platform 1 situated in Sector A at El Campanario as part of the internship requirement for the bachelor's degree at the University of Trujillo (Peru). This excavation revealed the presence of adobe walls at different levels, some of them painted with yellow color. The presence of various construction events suggests that the platform increased in size over time, probably in relation to socio-political changes in the Huarmey Valley. Eche Vega argues that the second construction event was oriented to building a large open space (possibly a patio) to conduct public events in order to forge social alliances with social groups in the Huarmey Valley (Eche Vega 2018:125). In addition, Eche Vega suggests that platform 1 was built as a political center, possibly culturally attached to the Casma Culture, but at the same time independent from the El Purgatorio (Casma Capital). The ceramic forms recovered at platform 1 consisted of bowls, cups, jars, and bottles. In addition, polychrome ceramic decoration associated to press-molded ceramics was also found during this excavation (Eche Vega 2008:124).

6.3 Survey and Mapping

During 2012 and 2013 I conducted an archaeological survey of the lower Huarmey Valley with the objective of selecting a suitable site for my dissertation research. Initially, there was an interest in studying changes at the household level during the Middle Horizon. However, most of the sites containing domestic occupation were damaged by the construction of the modern roads and settlements, which, most of the time, reused old construction materials to build new houses. The El Campanario site, located near the modern town of Huarmey, was damaged by looting and the construction of a modern cemetery on the west side. While the main adobe platform, located at the top of a natural elevation, was heavily destroyed by looting, the lower areas containing evidence of domestic activity were minimally damaged. In addition, previous archaeological surveys at the site suggested that it was occupied from the Middle Horizon to the Late Horizon (Bonavia 1982; Tabio 1977). Dorothy Menzel believed that the site was occupied during Middle Horizon Epoch 3 and Enrique Zavaleta and Rocio Sanchez proposed a relative date of the site of around A.D. 1000.

Ceramics observed on the surface corresponded mostly to Casma ceramics (Casma Molded and Incise) which extends from the middle half of the Middle Horizon to the Late Horizon. Along with Casma ceramic style there were some fragments of painted pottery consisted in black and white over a red or reddish surface. There painted fragments were found in the domestic areas associated with adobe walls. The preservation of the domestic area was good, and while there were some looting pits, it is most likely that looters did not find valuable artifacts and therefore did not continue with systematic destruction of this sector.

The selection of the area of excavation was based on the preservation of the site as well as the presence of press-molded, incise and painted pottery. While initially I thought the site had been occupied at some point in the Middle Horizon, radiocarbon dates showed that the domestic areas were used during the Late Intermediate Period. The presence of painted pottery indicated the use of this style by households after the collapse of the Wari influence in Huarmey.

Mapping the site was conducted during the fieldwork season of 2015-2016. The map was elaborated using a total station in order to define spatial distribution of structures visible on the surface. Mapping will also help to select future excavation areas at the site. The permits for the archaeological research in 2015 and 2016 were obtained from the Peruvian Ministry of Culture, the government institution who manages and protects archaeological sites in Peru. The field season of 2015 consisted of 5 weeks (3 weeks excavation and 2 weeks lab work) and in 2016 the field season was 11 weeks (7 weeks excavation and 4 weeks lab work). In addition, further material analysis was conducted in December of 2016 (4 weeks), July 2017 (3 weeks) and November 2018 (4 weeks).

6.4 Division of the Site

There was no previous archaeological excavation at El Campanario The division presented here is arbitrary and not related to the time periods of occupation or to specific activities performed at the site. In order to divide the site, I took into consideration the distribution of archaeological material and the type or architecture visible on the surface to divide the archaeological site into four distinct sectors (Figure 6.2). The sectors established at the site are as follows:

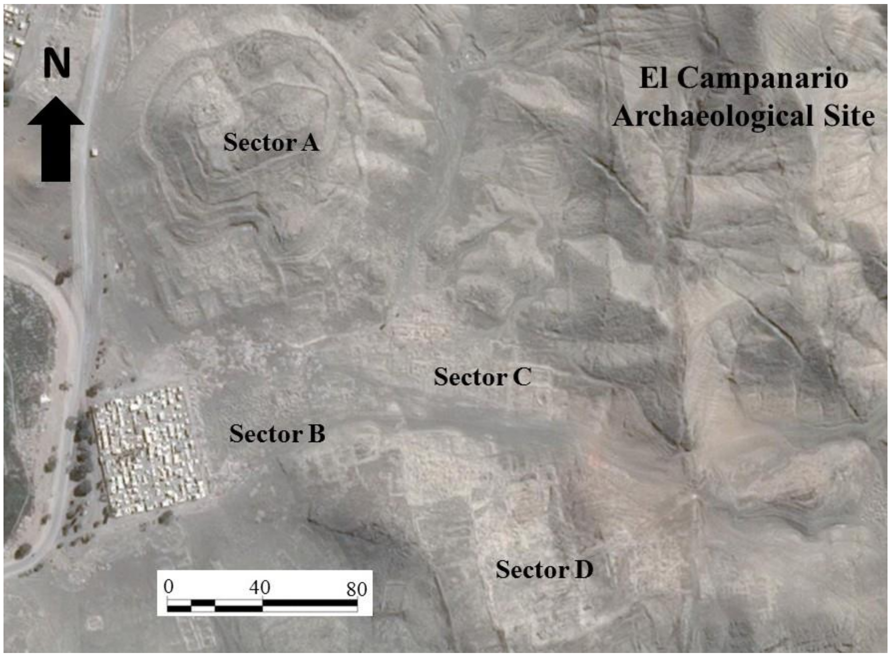

Figure 6.2: Location of the sectors at El Campanario Site

6.4.1. Sector A

This sector is located on the north-west side of the complex and is composed of an adobe (mud brick) platform built on top of a rocky outcrop. There is evidence of semi-circular structures built with adobes seriously damaged by looting (Figure 6.3). Human remains and textiles fragments found at the site suggests that these structures were used as burials. Along with the platform there are two adobe walls at different level surrounding the platform and built above the natural rocky outcrop.

Figure 6.3: Circular adobe structures at sector A

This area was named the "Cerro de los tres circulos" by Ernesto Tabio (1977). Also, in this sector Zavaleta and Sanchez (2011) identify an adobe wall with reliefs depicting stingrays or snakes along with painted pottery sherds. However, during my survey on this sector, I was unable to observe any diagnostic pottery.

6.4.2. Sector B

This sector is located on the east side of the modern cemetery of Huarmey and contains remains of *tapia* walls with characteristics similar to those noted by Donald Thompson (1967) at the site near the Huarmey port. On the south side of the modern cemetery there is a rectangular structure with internal subdivisions, probably used as a storage facility possibly associated with the last occupation of the site. In this sector there are also human remains; Huarmey inhabitants refers to this sector as the Chinese cemetery. It is possible that this area was reused for burial purposes for immigrants during the Colonial and Republic periods in Peru and still used by modern day Huarmey population (Figure 6.4). But today, this sector is currently used as a refuse dump for trash by the population of Huarmey.

Figure 6.4: Sector B at El Campanario. The modern cemetery is in the background

6.4.3. Sector C

This sector is located to the south-east of sector A and contain evidence of domestic activities such as organic remains and fragments of large ceramic vessels. The archaeological excavation in 2015 and 2016 were conducted in this sector in order to understand household activities. This sector was described as a cemetery by Ernesto Tabio (1977) based on the rectangular adobe structures found on this area and extended to the actual cemetery (Tabio 1977:119). This sector does not have significant damage by modern looting or modern trash refuse since is located 50 meters east form Sector B. The data and interpretation contained in this dissertation are based on the finding obtained during the archaeological excavation and material analysis from this sector.

6.4.4. Sector D

This sector is composed of a series of terraces which were built using uncut stones and mud (Figure 6.5). These terraces are located in the south-east of the site and, since most of the stones have collapsed, only the large external walls are visible at the surface. There are no evidence of internal subdivisions or significant presence of organic material that could yield information about the activities conducted in this sector.

Figure 6.5: View of sector D at El Campanario

6.5 Excavation Process at Sector C

The excavation of Sector C at El Campanario was oriented to observe spatial distribution of domestic architecture and recover material evidence associated with this architecture. During the field season of 2015, a small trench of 2 x 8m was excavated in an area that had shallow depression containing evidence of architecture. The excavation of this trench reached the sterile layer in order to determine the occupation sequence at the site. In the field season of 2016, units of 2x2m were excavated at various areas in Sector C. A total of 38 units were excavated which allowed us to observe spatial distribution at the site as well as to recover various types of archaeological material. During the two field seasons, a total of 168 square meters were excavated which constitute 0.02% of the total surface of the site and about 0.4% of Sector C.

The excavation was conducted using trowels and brushes, and in some instances when the layer was very compact, a small pickaxe was used. It was conducted by removing each cultural layer and recording every artifact by their provenance. The soil was screened using a 1/4 and 1/8 mesh and significant artifacts were collected. In the case of the surface and first layer I used 1/8 mesh to recover ceramics, organic material, such as maize, and lithic artifacts, while the 1/4 mesh was used in deposits that contain mostly organic material such as features or cooking areas. Organic remains recovered provided information about subsistence patterns, while ceramic and textile remains were used to establish cultural affiliation of El Campanario residents. Finally, excavations of the adobe wall at each unit were done down as far as their foundation. This strategy allowed the observation of changes in architecture and modification of spatial organization at the site.

6.6 Post-Excavation Material Analysis

Material remains recovered during the excavation were separated into categories for their analysis. Organic remains were separated into botanical (edible and non-edible), marine (fish and shellfish), and faunal. The presence of organic materials within household contexts was used to define the function of each area at the site. Ceramic vessels provided information on preparation, storage and consumption of food. The analysis of ceramics consisted of washing the diagnostic sherds in order to group them by form and decoration. This analysis was conducted by comparing sherds found here to Casma style sherds found at other Casma sites (Kosmeider 2011; Przadka-Gierz 2011; Vogel 2003, 2011, 3016, 2017). In addition, ceramic paste analysis and compositional studies were conducted on pottery sherds to observe variation in paste composition and trace elements.

Textiles analyses were conducted by Diego Fernandez Siccha as part of his archaeology license thesis. Selected samples were analyzed based on manufacturing technique and style and observed variation in coastal and highland traditions in order to determine the cultural relationship between coastal and highland communities during the Late Intermediate Period. The textiles were preserved using acid free paper and stored in cardboard boxes.

Macroscopic analysis of botanical remains was conducted by Emely-Anne Davis (University of Central Florida) and identification of shellfish species was conducted by Jacob Warner (Louisiana State University). Analysis of human remains was completed by Jenna Hurtubise (University of Alabama). Ceramic analyses of form and decoration were performed after the summer fieldwork seasons of 2015 and 2016. Paste analysis (digital microscope) and composition analysis (pXRF) were conducted in 2017, and the faunal analysis was completed in

2018. The artifacts recovered for this dissertation along with the catalog of materials, are stored in the Regional Museum of Max Uhle in the city of Casma (Peru).

6.7. Excavations at Sector C

Sector C at El Campanario contains evidence of domestic activities on the surface. During the initial survey, evidence of looting in this sector included the presence of adobe walls as well as organic remains (maize cobs, animal bones and various types of seeds). However, most of the architecture in this sector is not visible on the surface and excavation units were chosen based on slight differences in elevation of the terrain perhaps related to walls or other architectural features. In addition, pottery sherds observed on the surface shows attributes similar to the Casma pottery style which is commonly found in the Casma Valley. Excavations in Sector C were conducted during the summer of 2015 and 2016 during which time one unit was excavated during the first field season and eight units during the second (Figure 6.6).

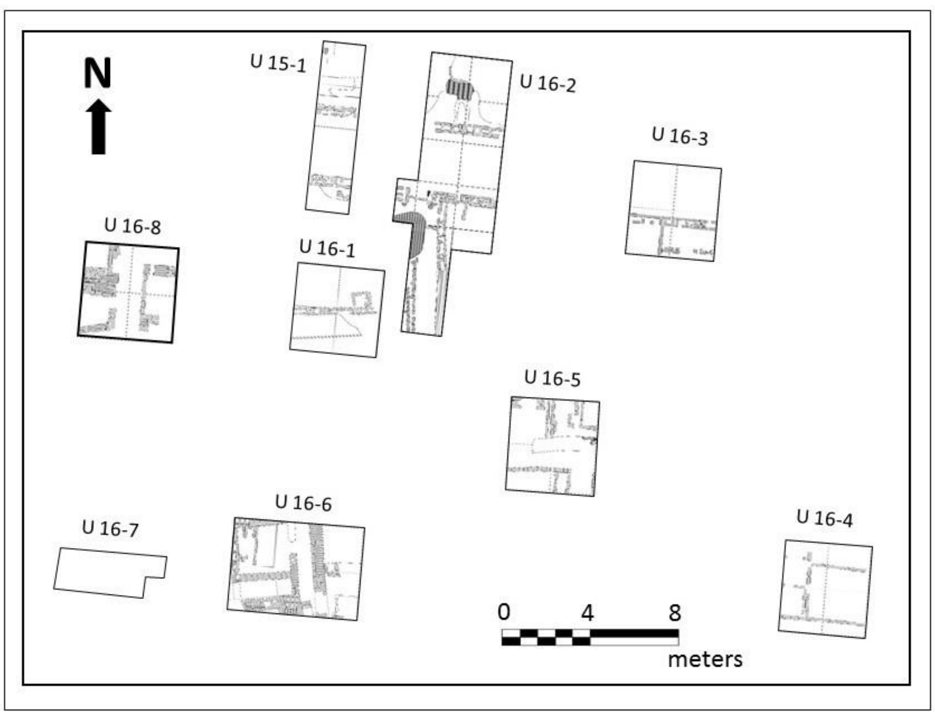

Figure 6.6: Location of the units excavated at Sector C

6.7.1. Unit 15-1

This unit measured 2 x 8 meters; there were two adobe walls separated by an open area that probably was a patio. Both walls were built with *caña brava* (cane poles) in the foundation and, in some instances, uncut stones in the rest of the construction. On the north side of the unit, there were also remains of an adobe wall, but unfortunately, previous looting activity had destroyed a significant portion of this wall. In addition, there were remains of *caña brava* forming a division associated with guinea pig coprolites, and it is possible that this structure was used to keep these animals (Figure 6.7). On the north side of the unit there were abundant remains of marine life, such as mollusks, especially *Perumytilus purpuratus*, and *Enoplochiton niger*, along with various fish vertebrae. The types of ceramic found included blackware pedestal bowls, other bowls, cups (redware and blackware), jars, neckless ollas, and *tinajas*. Ceramic decoration included Casma Molded (dots with lines, dots, geometric and zoomorphic designs), and one fragment with Casma Serpentine Appliqué decoration.

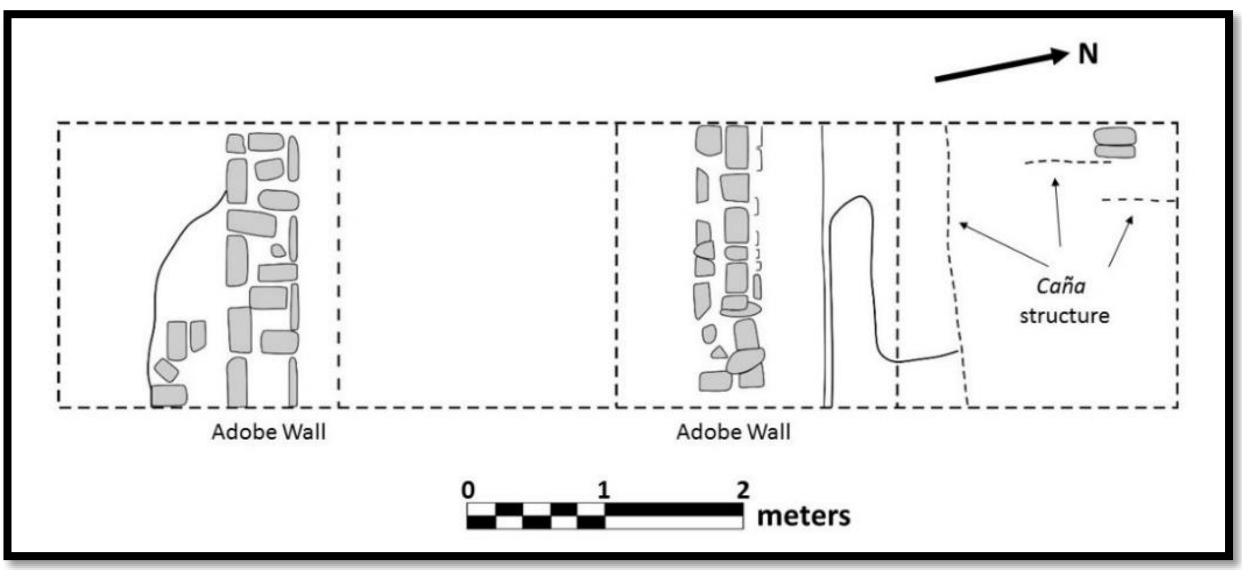

Figure 6.7 Floor Plan of Unit 15-1

6.7.2. Unit 16-1

The excavation area measured 4 x 4 meters which led to the uncovering of an adobe wall with east-west orientation. Attached to the wall was a quadrangular adobe structure on the east side of the unit. The excavations on the south side of the adobe wall uncovered a layer of organic material which was deposited above an ash layer (Figure 6.8). The organic layer contained around 291 maize cobs along with peanuts, cotton bolls and various species of beans. Fruit seeds such as lucuma, pacae, avocado, cherimoya and guanabana were also recovered from this layer. In addition, marine resources, especially shellfish, were found as well as camelid vertebrae.

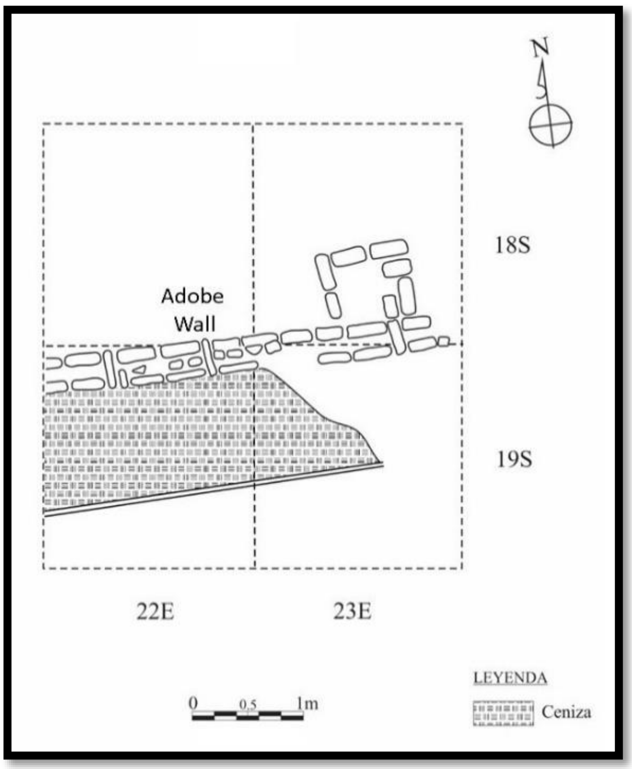

Figure 6.8 Floor Plan of Unit 16-1

The layer of ash extended along the adobe wall where some burned adobe was still visible and was perhaps used for food preparation (Figure 6.9). Ceramic fragments recovered on the south side of the unit included redware and blackware pedestal bowls, two of which had press-molded decoration on the exterior base. Other ceramic types included cups (redware and blackware) and various sizes of jars. Ceramic decoration on the south side consisted of press-molded (dots, lines and dots with lines decoration) and incised (circles and lines decoration). In addition, 51 gourd fragments were recovered of which one was decorated. It is possible that these gourds were also used for serving food. The excavation on the north side of the wall showed a layer of clay and fine sand but did not contain archaeological material. Below the clay layer, few organic remains were recovered and the ceramic styles and decoration were similar to the ones found on the south side of the unit. However, some bowl fragments had painted white and black lines on orange paste surfaces. On the north side of the wall was evidence of a hard floor associated with the adobe wall.

Figure 6.9: East-west view of unit 16-1

6.7.3. Unit 16-2

This unit was the largest excavated at the site that originally was 4 by 8 meters. Later the excavation extended 2 by 6 meters to the south of the unit. The unit contained two large adobe walls oriented east-west and separated by an open space of about three meters and possibly served as a patio (Figure 6.10). During the excavation of the north side of the unit, the remains of an adobe wall and a tamped floor above the *caña* foundation was identified. The adobes used to build this wall had been removed and probably reused in later constructions, such as the structure located in unit 16-6. The only visible evidence of the wall is the prints of the adobes along with the reds (*caña brava*) which were used on the foundation. The excavation of the north side of the unit led to the identification of remains of maize cobs, seeds and gourd fragments, along with marine resources (sea shells) and a few camelid bones. Ceramic fragments recovered on the north side included pedestal bowls (redware and blackware), painted pedestal bowls, cups, jars, *ollas*, *tinajas*, and three ceramic molds. Ceramic decoration included press-molded (dots with lines, dots, lines, and geometric designs), incise (lines and circle with dots), Serpentine Appliqué (three fragments) and painted fragments. In addition, evidence of intense burning was identified during the excavation showing that this area was possibly used to fire pottery vessels.

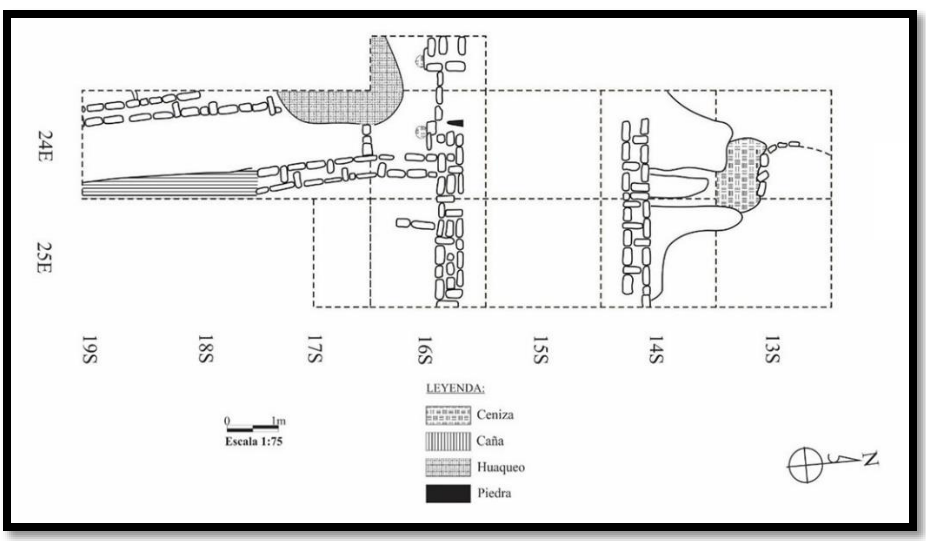

Figure 6.10 Floor Plan of Unit 16-2

The area between the north and south wall was interpreted as a patio relating to residential areas. In this patio, 550 maize cobs were recovered, along with peanuts, various types of beans, and large quantities of seeds such as lucuma, pacae, cherimoya, guanabana and avocado. Marine resources were also abundant of which the most noticeable species were *Choromitilus chorus*, *Concholepas concholepas* and crab fragments, along with fish vertebrae. Fragments of camelid skulls, mandible and ribs were also recovered from the patio.

There were also approximately 96 gourds fragments. The ceramic fragments constituted mostly of pedestal bowls (redware and blackware) and two blackware pedestal bowls with press-molded decoration on the exterior base, as well as cups (redware and blackware), jars and few *ollas* and *tinajas*. Ceramic decoration included Casma Molded (dot with lines, lines and geometric designs) Casma Incise (circle and lines), six fragments of Casma Serpentine Appliqué, and ten painted fragments.

On the south side of the unit there was another, better preserved adobe wall since there was no evidence of adobes having been removed from the wall. To the south was evidence of a tamped floor. This wall also had reeds as foundations along with evidence of clay plaster to cover the wall as decoration; however, there was no evidence of paint on the wall. During excavation, the presence of a doorway was identified in which a line of bricks had used to seal the entrance at the time of the site's abandonment. On the south side was another adobe wall built to create partitions within the residential area. This wall extended to the south during new construction since the architectural plan followed a different orientation and the wall's foundations were over the foundation of previous structures. The aim of this new construction was to build a narrow corridor associated with the adobe wall found in unit 1. On the south side, approximately 300 maize cobs were recovered, along with peanuts, beans, cotton bolls, and various seeds species (lucuma, pacae, avocado, cherimoya, and guanabana). Marine resources (sea shells) were also abundant, the most common being *Tegula atra*, *Perumytilus purpuratus*, and *Enoplochiton niger* along with a few fish vertebrae. In addition, terrestrial fauna remains were recovered, such as camelid bones (vertebrae, ribs and limbs) and two guinea pig skulls. Ceramic fragments included pedestal bowls (redware and blackware); some of these had press-molded decoration on the exterior base and others were painted on both the interior and exterior wall. Cups (blackware and redware), along with two blackware cups with press-molded decoration on the exterior base, were also identified. Other vessels included jars, *ollas* and *tinajas*. Ceramic decoration appeared in Casma Molded (dots, dots with lines, geometric and zoomorphic designs), Casma Incise (lines, and circle with dots), three fragments with Casma Serpentine Appliqué decoration, and ten painted fragments.

6.7.4. Unit 16-3

Excavation of this unit uncovered the continuation of the adobe wall found on the south side of unit 2 (Figure 6.11). To the north side of the unit there was no evidence of architecture and it is possible that the patio identified in unit 16-2 extended as far as this unit (Figure 6.12).

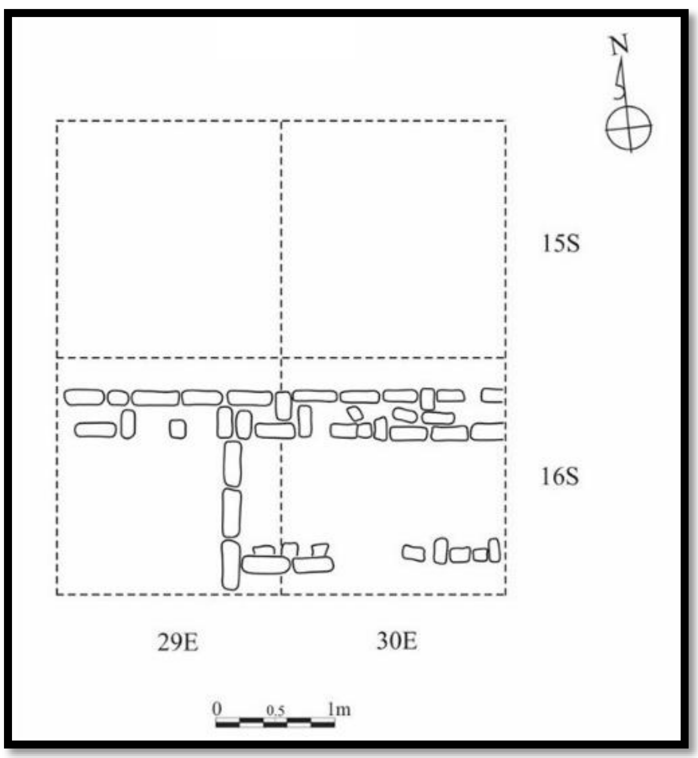

Figure 6.11 Floor Plan of Unit 16-3

In addition, accumulation of organic materials was found on this patio which included maize cobs, seeds of various species, gourd fragments, and cotton bolls, along with a few sea shells and camelid bones. Ceramic fragments includes pedestal bowls (redware and blackware), pedestal bowls with press-molded decoration on the exterior base, cups (redware and blackware), jars, and *tinajas*. The ceramic decoration was mostly press-molded (dots, and dots with lines) and one figurine. On the south side of the unit there were thin adobe walls covered with a layer of organic materials. Large quantities of maize cobs, peanuts, cherimoya and guanabana seeds were found along with various amounts of marine species such as *Tegura atra*, *Perumytilus purpuratus*, *Enoplochiton niger*, and crab fragments.

Figure 6.12: East-west view of unit 16-3

There were also bone fragments of camelids such as vertebrae and phalanges. On the south side of the unit, there was also evidence of intense burning activity associated with organic remains and perhaps used for food preparation. In this area, there were remains of sea birds which were probably part of their diet. Ceramic types included pedestal bowls (redware and blackware), bowls, cups (redware and blackware), jars, and tinajas. Ceramic decoration was mostly press-molded (dots, dots with lines, and geometric designs) and a few incise fragments.

6.7.5. Unit 16-4

This unit is located in the south-east part of the excavation area. During fieldwork a dense layer of yellow clay and fine sand was uncovered. This layer was very compact and did not contain evidence of archaeological material, which led to the conclusion that it was formed during a rainfall event that affected the site. After removing the clay layer, it was possible to identify various adobe walls built by aligning individual adobe bricks. These walls were probably used for internal partitions within the residential areas (Figure 6.13). On the north-east side of the unit was an enclosure containing guinea pig *(cuy)* coprolites, possibly kept in this area as part of food supplies (Figure 6.14). On the west side of the unit were adobe walls arranged to form small spaces possibly used to store food or other items.

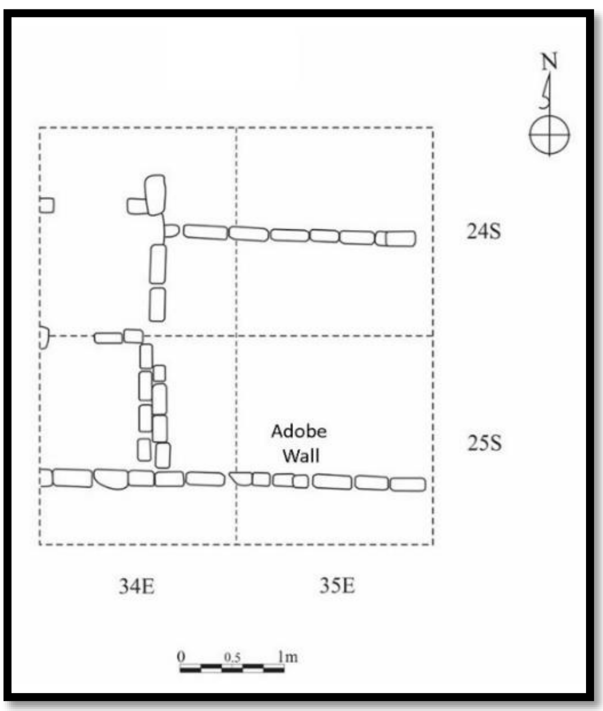

Figure 6.13 Floor Plan of Unit 16-4

There was evidence of maize cobs, seeds of various species, cotton bolls, and gourd fragments along with fish vertebrae, in addition to various species of mollusks, of which the most abundant were *Tegula atra, Perumytilus purpuratus, Enoplochiton niger, Concholepas concholepas,* and *Protothaca thaca.* Ceramic styles found in this unit included pedestal bowls (redware and blackware), pedestal bowls with press-molded decoration on the exterior base, bowls, cups (redware and blackware), jars (press-molded and incise decoration), *ollas (*neckless, cambered and with twisted handles), numerous *tinajas*, two ceramic molds, four *torteros* (used in spinning activities), and two figurines. The ceramic decoration constituted press-molded (dots with lines, dots, lines and zoomorphic designs), incise (lines), Serpentine Appliqué and eleven painted fragments.

Figure 6.14: East-West view of unit 16-4

6.7.6. Unit 16-5

Excavation of this unit uncovered a layer of clay and fine sand as was observed in unit 16-4. After removing this layer, a series of walls of aligned adobe brick were found. Also in this unit and next to an adobe wall was a large space (Figure 6.15) containing maize cobs, various kinds of seeds including cotton seeds, bean pods, seas shells and fish vertebrae. It is possible that this space was used to deposit food remains. But the real function of this unit remains unclear, as there is no evidence of food preparation or any other specialized activity; however, the presence of 54 cotton bolls suggests that the area was used to store cotton or for the initial stage of textile production. During excavation, there was an accumulation of reeds (*caña brava*) covered with clay plaster. This arrangement of the reeds was associated with the adobe walls and foundation observed at other units. In addition, evidence of a wooden pole was noted attached to the reeds.

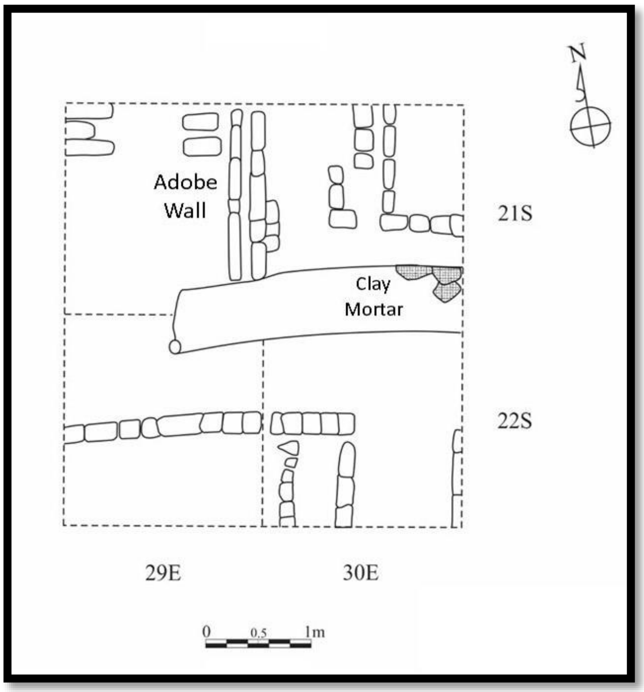

Figure 6.15: Floor Plan of Unit 16-5

Food remains here included maize cobs, large quantities of cherimoya and guanabana seeds, and gourd fragments in addition to various species of mollusk of which the most abundant were *Tegura atra, Perumytilus purpuratus, Enoplochiton niger, Fissurella limbata, Choromytilus chorus,* crab fragments and with fish vertebrae. Ceramic types consisted of pedestal bowls (redware and blackware), bowls, cups (redware and blackware) jars, cambered *ollas*, *tinajas*, and one *tortero*. Ceramic decoration included press-molded (dots with lines, dots, lines, and geometric designs), incise (circle with lines, circles, and lines), four fragments with Serpentine Appliqué decoration, and two painted fragments.

6.7.7. Unit 16-6

Excavation of this unit consisted of the removal of a layer composed of adobe brick which possibly collapsed after abandonment of the site. The excavation at this unit allowed me to identify a fine and well-preserved architecture consisting of adobe walls plastered with clay. The walls surrounded a small room with narrow access on the east side. Attached to the south wall was a bench of quadrangular adobe bricks (Figure 6.16). On the east side of the access there was a corridor that could have connected the small room to other areas. In addition, elaborate floors were noted on the east side of the unit, along with remains of a wooden post (possibly *argarrobo*).

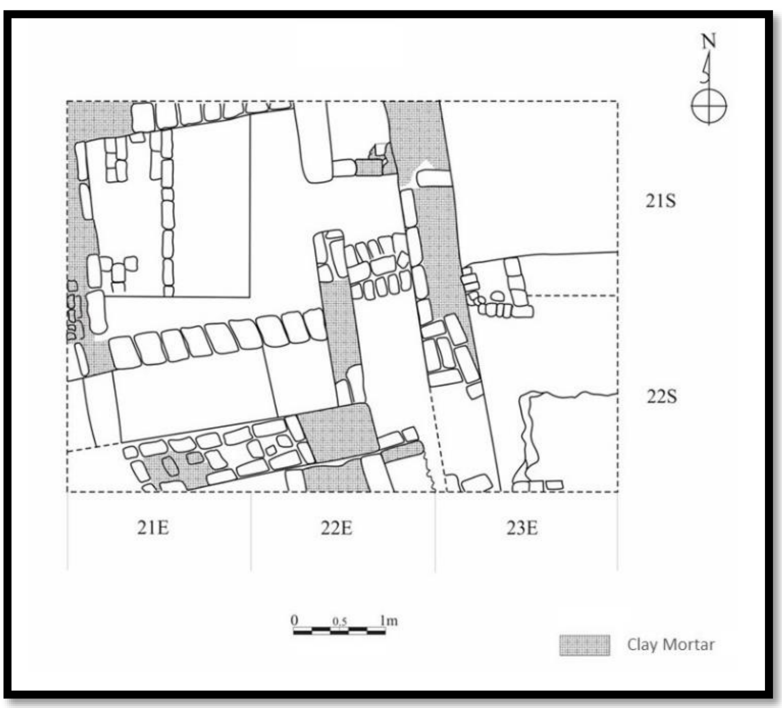

Figure 6.16: Floor Plan of Unit 16-6

During excavation there was no evidence of the clay and fine sand layer noticed in other units and, based on the architecture of this unit, it is possible that the last occupation at sector C was not related to domestic activities (Figure 6.17). There were several remains of maize cobs and fruit seeds, such as pacae, cherimoya and guanabana, along with a few gourd fragments. While there were no significant number of mollusks in this unit, a majority of sea shells were recovered from layers one and two. Neither was there evidence of terrestrial animal remains or fish vertebrae. Ceramic types found in this unit consisted of a few pedestal bowls (redware and blackware), bowls, cups (redware and blackware), *ollas*, two figurine, and two *torteros.* The ceramic decoration included press-molded (dots with lines, dots, lines, and zoomorphic designs), incise (circle and lines), and four painted fragments.

Figure 6.17: North-south view of unit 16-6

6.7.8. Unit 16-7

Excavation did not uncover evidence of architecture. However, the same clay and fine sand layer which also appeared in other units at the site was also identified here (Figure 6.18). Food remains consisted of maize cobs, lucuma, cherimoya and guanabana seeds, various species of beans as well as gourd fragments and fifty-six cotton bolls. Marine resources, especially mollusks, were also recovered, the most common species being *Tegula atra, Fissurella limbata*, *Perumytilus purpuratus,* and *Enoplochiton niger*. Besides marine species, there were five individual *Scutalus* sp., which is a terrestrial snail commonly consumed on the north coast of Peru. During excavation, an almost complete including its fur but minus the head was found. It is unclear if this camelid was discarded during food preparation or placed in the area as an offering. One small space containing burned material was found above the camelid remains. Ceramic types in this unit consisted of pedestal bowls (redware and blackware), bowls, cups (redware and blackware), jars, *ollas* (cambered and neckless), *tinajas*, and one *tortero*. Ceramic decoration included primarily press-molded (dots with lines, dots, and lines) incise (lines), two fragments with Serpentine Appliqué decoration, and seven painted fragments.

Figure 6.18: Clay Layer at Unit 16-7

6.7.9. Unit 16-8

Excavation of this unit uncovered thin adobe walls used as partitions. On the west side of the unit were various collapsed adobes which were part of a wall (Figure 5.19). In some sections there was the same clay and fine sand layer noted in most of the other units above a semi-rectangular structure containing guinea pig (*Cavia porcellus*) coprolites. The absence of food preparation activities suggests that guinea pigs were kept in this area along with other food sources. In addition, two small burned areas near the walls associated with camelid bones were recorded, possibly offerings within the residential areas.

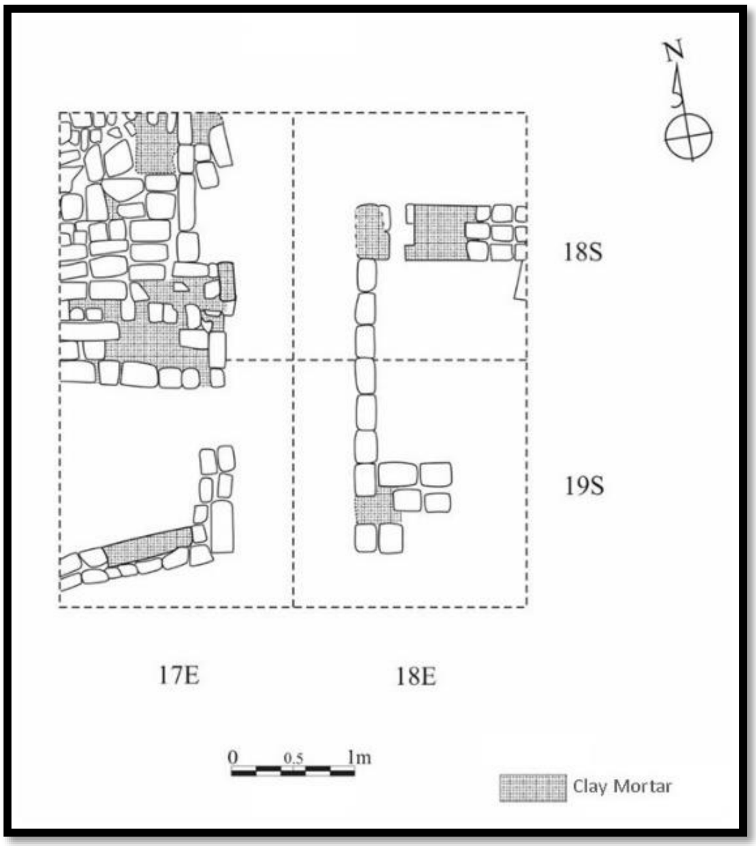

Figure 6.19 Floor Plan of Unit 16-8

Food remains found in this unit included maize corn, seeds of various species, and gourd fragments. The quantity of marine resources, especially mollusks, was low. However, camelid remains appeared in larger quantities than in other units. Ceramic types consisted of pedestal bowls (redware and blackware), pedestal bowls with press-molded decoration on the exterior base, bowls, cups (redware and blackware), jars, neckless ollas, *tinajas*, one figurine, and one *tortero*. Ceramic decoration included press-molded (dots with lines, dots, lines, and geometric designs), incise (circle and lines, circle and lines), and one fragment of Serpentine Appliqué decoration.

CHAPTER SEVEN:

HOUSEHOLDS MATERIAL CULTURE AT EL CAMPANARIO

7.1 Household Architecture

Residential areas in sector C at the El Campanario site are located in the lower section between two natural elevations (Figure 7.1). One of these elevations, located northwest of the residences, contained a large adobe platform (Sector A) where public events were probably conducted. The other hilltop to the south of the residential areas had a series of stone structures, and it is possible that the residents at the site were using this area as living space (Sector D).

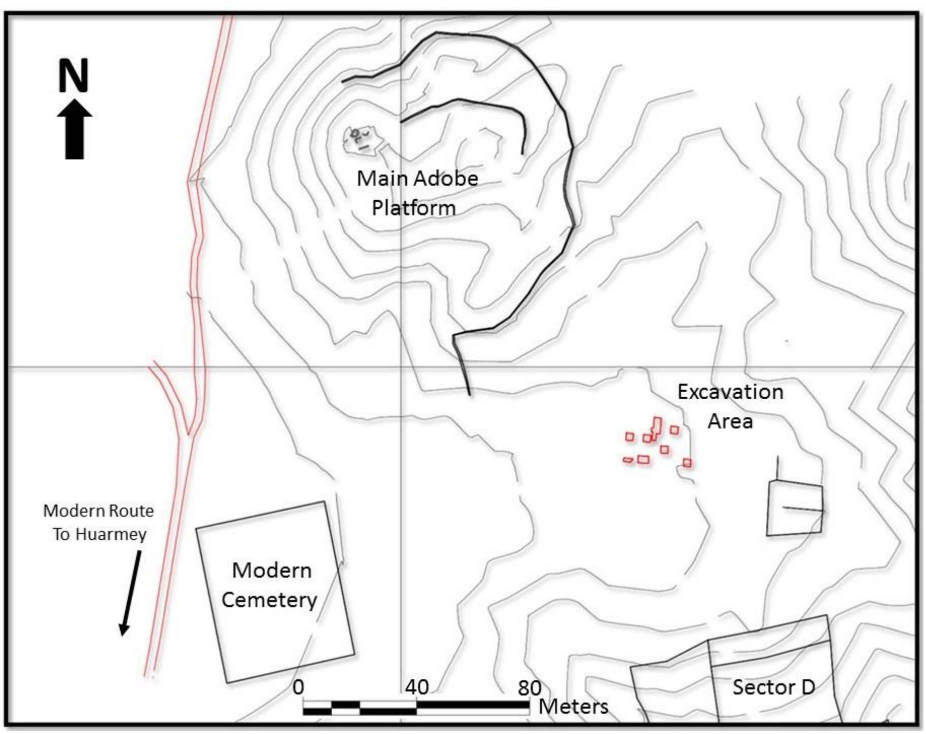

Figure 7.1 Location of the Excavation Area at El Campanario

7.1.1 Construction Techniques

Excavations conducted in residential areas showed the use of various techniques during construction of the walls. Techniques used in the construction of two large walls reported in unit 16-2 and 16-3 consisted of placing adobes flat on the edge of the wall, then using rowlock adobes to create a cavity, subsequently filled with sand (Figure 7.2a). This technique allowed economizing on construction material (adobe) in the building. The walls ranged from 40 to 44 cm in width and it is possible that they were used to separate large households or compounds as noted at other Casma sites. Some walls contained remains of clay plaster but there was no evidence of any color. The second construction technique consisted of making two parallel rows of adobes, leaving an empty area between them which was then filled with sand (Figure 7.2b). These walls ranged from 38 to 40 cm in width and it is possible that wattle and daub structures were placed in the openings; however, there was no evidence of organic remains. Another technique was observed in unit 16-1, 16-4, and 16-8 in which two lines of adobes were placed together without leaving a cavity between them (Figure 7.2c).

These walls range from 24 to 26 cm and possibly used to divide internal activity areas. The wall found at unit 16-1 was used to divide the area of food preparation; the other wall found at unit 16-4 was used to organize a storage area, and the wall in unit 16-8 was part of an enclosure for guinea pigs (*cuyeras*). The third technique used at the site was a single row of adobes for internal subdivisions within the residential areas (Figure 7.2d). There were no elaborate floors associated with the walls, and most of the household spaces consisted of tamped floors and walls of long rectangular adobe.

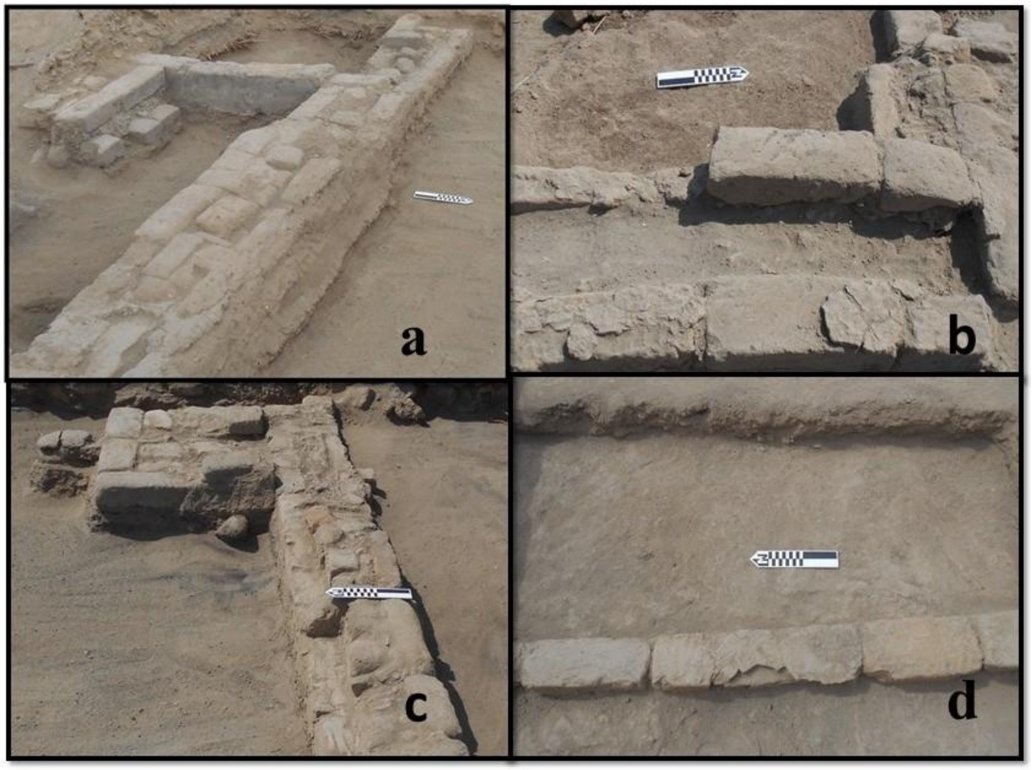

Figure 7.2 Adobe Walls Constructions Techniques at El Campanario: a) unit 16-3 view west-east; b) unit 16-2 view east-west; c) unit 16-1 view west-east; d) unit 16-4 view west-east.

Most of the walls at the site were of rectangular adobes; however, one structure containing various sizes of adobes was located in unit 16-6 (Figure 7.3a). Walls of this structure were covered with yellow colored clay plaster. Quadrangular adobes formed a small enclosure as well as a bench attached to the south wall (Figure 7.3b). This enclosure had only a tamped floor. However, elaborate clay floors were found on the east side of the unit where there was evidence of a wooden column most likely made of *algarrobo* or *espino* wood (*Acacia sp*) and possibly used to support the roof. There was also evidence of two clay floors built above the aforementioned floor belonging to the last occupation of the site, of which, unfortunately, there is little information.

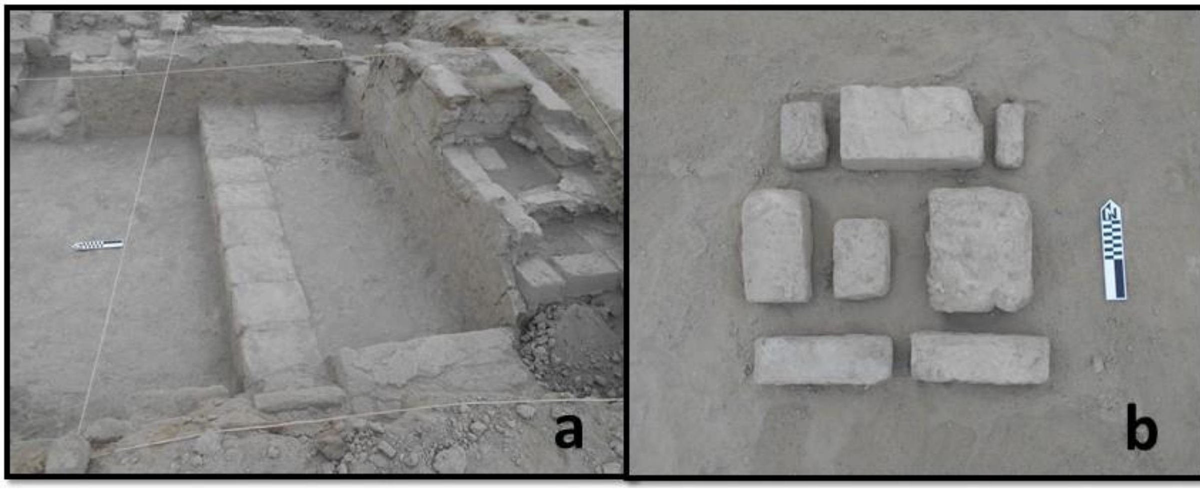

Figure 7.3: Adobes: a) unit 16-6; b) various adobe sizes found at the site.

Another material used in the construction of El Campanario residences was *caña brava* (*Gynerium sagittatum*). Before construction of walls, *caña* was placed on the sandy surface aligned transversally to the orientation of the wall (Figure 7.4a). Excavation showed that only large adobe walls had the *caña* arrangement at their foundations, possibly to provide better support. *Caña brava* was also used to separate a small space in unit 16-2 where guinea pig coprolites were found. These animals were most likely kept within this *caña* structure (Figure 7.4b). C*aña brava* was one of the most abundant and useful construction materials on the coast of Peru, since they were used to build *quincha* (wattle-and-daub) structures as well as roofs for domestic and public structures.

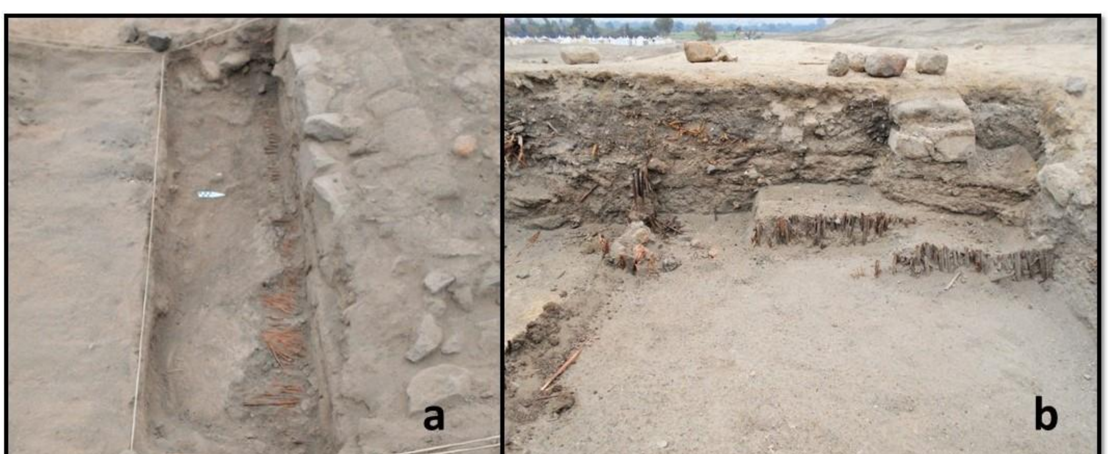

Figure 7.4: Caña: a) *caña* used at the wall foundations; b) *caña* structures

El Campanario architecture displayed characteristics different from other Casma sites. At the site of El Purgatorio, adobe structures associated with the elite were of stone foundations and adobe walls; later, the entire wall was covered with clay plaster to give the appearance of adobe platforms (Vogel 2017; Vogel and Pacifico 2011). Stones seemed to be commonly used at El Purgatorio, since adobe was a labor-intensive material and likely used exclusively by the elite; however, *caña brava* foundations, found at El Campanario, were absent at El Purgatorio. Another Casma site, Cerro la Cruz, located on the northern frontier of the Casma territory, displayed the same characteristics as El Purgatorio, such as stone structures and foundations with adobe walls related to the local elite. In addition, the presence of *quincha* (wattle-and-daub) structures at both sites were associated with commoners' areas, indicating unequal access to construction materials.

7.1.2 Analysis of Adobe Bricks

The most common construction material used in most structures at El Campanario was adobe bricks, which required the preparation of mud, placing the mud into molds (typically rectangular molds), and allowing them to dry outdoors. The adobes at El Campanario showed no evidence of maker's marks found at other sites on the north coast of Peru (Hastings and Moseley 1975; Shimada 1990). The only evidence of marks on the El Campanario adobes were handprints, showing the way mud was pressed into the molds. The absence of marks could indicate that production of adobes was not part of a tribute system and that household groups produced their construction materials locally.

Figure 7.5 Adobes found at El Campanario site.

Dimension of the adobe bricks found at the were very similar, ranging from 16 to 43cm in length, 7 to 16cm in width, and height from 4 to 11cm (see appendix 2). The only evidence of variable adobe sizes was found in unit 16-6, associated with a more elaborate architecture compared to the other units (Figure 7.5). As previously stated, it is possible that the structure at unit 16-6 was related to the last occupation and the variation of adobe sizes might be related to their reuse, left behind by household members at the time of abandonment.

The use of adobe brick at El Campanario may has been related to social differentiation. Adobes was the preferred construction material for high-status individuals, and it is most likely that residents of sector C of El Campanario were socially different from other groups, such as the residents of sector D who used uncut stones and mud mortar. In addition, low alluvial deposits on both banks of the Huarmey River might have made it difficult for El Campanario residents to obtain raw materials for adobe manufacture. Modern day brickwork in Huarmey does not use clay in the manufacture of bricks but instead use cement mixed with sand, rubble and water and placed molds to dry. Thus, construction techniques at El Campanario aimed to save as many adobe bricks as possible during construction of the walls.

7.1.3 Access

Access to households and the movement within them was difficult to define. Based on the excavation at sector C it is possible to identify two residential areas; however, another residence was possible located in unit 16.4 but the limited excavation did not confirm the presence of another residential area. The only evidence of household access was found at unit 16-2 and consisted of a main entrance to the household of only one meter wide. In addition, two postholes were found on either side of the entrance, possibly placed to hold a door (Figure 7.6a). At the same unit, there was a corridor giving access to internal spaces in the household. Another access was found in unit 16-6, 48 cm wide, associated with a corridor. This doorway allowed access to a small enclosure with a bench, and while the function of this enclosure is unknown due to the lack of artifacts, it was most likely used for private activities (Figure 7.6b). Unfortunately, the other unit excavated did not have evidence of access or corridors that could help to understand the pattern of movement within the household.

Figure 7.6: Access observed at El Campanario: a) main entrances found at unit 16-2; b) small access found in unit 16-6

7.2 Radiocarbon Dates

Charcoal samples were recovered from secure contexts in aluminum bags for dating. The permit to transport the charcoal samples for AMS dating was from the Ministry of Culture of Peru; eight samples were sent to the Laboratory of Mass Spectrometry at the University of Yamagata in Japan (Table 7.1). The samples were selected from each unit in order to observe variations in the periods of occupation of the site. In addition, certain samples were selected based on the relation to other artifacts. For example, sample EC16-C53 was selected because in the same layer there were both press-molded and polychrome pottery sherds. The date of El Campanario occupation is related to the beginning of the Late Intermediate Period. Finally the calibrated date of sample YU-7030 collected from unit 16-3 is related to the Early Horizon and it is most likely that the site was previously occupied during this period; however more research is needed in order to observe the nature of the occupation during the Early Horizon.

Table 7.1: AMS dates from El Campanario site

Lab No	Code	Unit	Layer	Square	C14 date	Material	Calibrated 2 sigma
YU-7024	EC16-C6	16-2	2este	16S24E	838±20	charcoal	AD 1200-1280
YU-7025	EC16-C19	16-8	2	19S17E	909±20	charcoal	AD 1150-1230
YU-7026	EC16-C53	16-4	4	25S35E	817±20	charcoal	AD 1220-1280
YU-7027	EC16-C17	16-1	3	19S22E	838±20	charcoal	AD 1200-1280
YU-7028	EC16-C38	16-5	2	21S29E	839±20	charcoal	AD 1200-1280
YU-7029	EC16-C81	16-6	4este	24S21E	828±20	charcoal	AD 1200-1280
YU-7030	EC16-C28	16-3	2	16S29E	2436±22	charcoal	BC 550-400
YU-7031	EC16-C66	16-2	4	15S24E	812±20	charcoal	AD 1220-1280

AMS dates were calibrated using OxCal v4.2.4

7.3. Agricultural and Non-Agricultural Products

Agricultural production is an important economic activity in the Huarmey Valley today. However, more cash crops, such as asparagus, are replacing traditional crops. While this is changing the economy in the valley, fruit trees such as *pacae* and acacia species, such as *algarrobo* and *huarango,* are still maintained in the valley, most likely as alternative food sources and fuel.

Botanical remains recovered from El Campanario households shows that household members had access to different food sources. Ethnobotanical analysis was conducted by identifying macro remains, and soil samples recovered from the site will be used for future research (Table 7.2). The most common plant recovered at El Campanario was maize, which appeared in every unit although its frequency varied. A total of 2,568 maize cobs were recovered at the site. Although there were some differences in size during the identification process, maize cobs were not divided by size or number of rows (Figure 7.7). Other domesticated plants included *pallar* (*Phaseolus lunatus*), *frijol* (*Phaseolus vulgaris*), and *frijol pinto* (*Phaseolus vulgaris*). The use of maize, as well as chili peppers, has been documented in other Casma sites where chili peppers were most likely used as condiments in Andean meals (Vogel 2012:126).

Table 7.2: Botanical remains found at El Campanario

Botanical Remains	***n* counts per unit**									**TOTAL**
	15-1	**16-1**	**16-2**	**16-3**	**16-4**	**16-5**	**16-6**	**16-7**	**16-8**	
Maize cob	896	339	927	361	204	279	85	276	16	3383
Lucuma	215	103	163	97	22	110	15	51	3	779
Pacae seed	37	26	102	78	18	60	13	4	1	339
Avocado seed	88	26	184	56	8	24	3	5	8	402
Cherimoya seed	219	112	315	118	30	165	12	26	9	1006
Guanabana seed	864	93	443	127	102	326	28	60	3	2046
Guayaba seed	104	6	80	10		3				203
Peanut	50	6	19	15		3		2		95
Lima Bean (*pallar*)	14	10	12	3		5		21		65
Pinto beans		3	1							4
Kidney beans	5	13	1	4		8				31
Cane fragments	228	107	1113	447	96	347	69	138	3	2548
Cotton seed	8	7	1	33		6				55
Cotton boll	5	8	14	23	3	54		66		173
Gourd fragment	147	78	250	78	61	30	16	49	13	722
painted		1	1	1						3

Other plant species consumed as part of the household diet included fruit identified through seeds found at the site, including *cherimoya* (*Annona cherimola*), *guanabana* (*Annona muricata*), *palta* (*Persea americana*), *lucuma* (*Pouteria lucuma*), and *pacae* (*Inga feuilleei*). Although seeds provided information about the presence of certain species, in most cases this information could not be used to estimate the quantity of fruit that was consumed at the site. Each *guanabana* contains around 80 seeds, which is a little more than one *cherimoya*, which averages around 40 seeds. In addition, there were various sizes of *pacae* pods containing between 8 and 82 seeds each. However, *palta* and *lucuma*, which contain only one seed, could be used to obtain a more accurate estimation of household consumption.

Figure 7.7: Maize cobs from El Campanario

In addition, industrial plants were also part of the botanical remains recovered from El Campanario households. Cotton is the raw material need for textiles production, and 125 cotton bolls were found during excavations. *Algarrobo* (*Prosopis pallida*) pod fragments were also part of the botanical remains which made the quantity of pods at the site difficult to determine;

however, it was determined that *algarrobo* was used both as fuel and as animal feed. Another important plant found at the site was *caña* (cane) *brava* (*Gynerium sagittatum*), used in construction material for adobe walls, foundations, and probably roofs and *quincha* (wattle and daub) walls. Finally, large quantities of gourd fragments (575) were found, likely used to serve food and drinks, perhaps even during festivals, since some of the gourds (*Lagenaria siceraria*) were decorated (Figure 7.8).

Figure 7.8: Decorated gourds fragments found at El Campanario

7.4. Faunal Remains

Terrestrial animals were an important part of household diet at El Campanario. Fragments of camelid bones were found at almost every unit excavated, suggesting that household members had access to camelid meat (Table 7.3). The presence of camelid skull fragments, ribs, vertebrae, and long limbs indicates that camelids were locally raised. Isotope studies conducted on camelid remains from El Castillo de Huarmey showed coastal camelid husbandry with few non-local camelids, possibly the result of an exchange system sponsored by the elite situated at the provincial center of El Castillo de Huarmey (Tomczyk *et al*. 2018).

Studies of food production and consumption at the coastal site of Pacatnamu showed unequal distribution of llama bones, suggesting that the elite had greater access than commoners to camelid meat. Furthermore, this unequal distribution was important in defining power relations, with the elite controlling the production, distribution, and consumption of llamas (Gumerman IV 2002). At the site of Pedregal in the Jequetepeque Valley the residents during the Late Intermediate Period consumed immature camelids which might be an indicator that camelids were raised near the domestic structures (Cutright 2009:159). In Chan Chan the domestic areas dedicated to the production of various goods for high-status individuals show a high percentage of consumption of camelid meat compared to marine resources (Pozorski 1982:182). In addition, Shelia Pozorski studied three Chimú settlements and concluded that llama meat was provided by the Chimú state (Pozorski 1982:194). The consumption of camelids was also reported at the site of Lumbra in the Chancay Valley in which camelid remains appeared in domestic areas as well as in the administrative structure. The llamas found at Lumbra were raised locally and allowed the socio-economic interaction with other Chancay sites during the Late Intermediate Period (Van Dalen *et al.* 2014:99). Excavations at the Wari sites of Cerro Baul and Mejia showed that the Wari state relied on local household production and imported animal resources. The comparison of faunal remains between Cerro Baul and Mejia indicates that these were used as status symbols rather than subsistence staples (Moseley et al. 2005). During the Inca period, meat consumption in the form of *ch'arki* (dried camelid meat) was served on special occasions, especially during feastings (Bray 2003). In the Sausa region, animal consumption within the household continued from the pre-Inca to Inca period. While commoners and the elite, during the pre-Inca period, were differentiated not by the distribution of animal parts but by the quantity of meat consumed, during the Inca period, animal consumption increased within commoners' households as part of a leveling mechanism imposed by the Inca on the local population (Sandefur 2001).

At El Campanario, the presence of camelid bones indicate the importance of camelids consumption within the households, while during the excavations there was no evidence of coprolites that indicate that they were raised at the site. There is evidence, however, that camelid were raised on other coastal sites (Kent *et al.* 2013). It is possible that distribution of camelid meat was controlled by the elite and was served during elite-sponsored feasts (Gumerman 2000) or as part of a redistribute system controlled by a central state (Pozorski 1982).

Table 7.3: Faunal remains found at El Campanario

Faunal Remains	**Units**							**TOTAL**
	15-1	**16-1**	**16-2**	**16-3**	**16-4**	**16-5**	**16-8**	
Camelid								
Skull			1					**1**
Mandible	2	1	1				1	**5**
Teeth							4	**4**
Vertebra		1	5	1			20	**27**
Scapula							2	**2**
Ribs	1		5			1	10	**17**
Sacro							1	**1**
Femur			1				2	**3**
Tibia			1					**1**
Ulna			2					**2**
Falanges	2		1	1			6	**10**
Other				1			6	**7**
Guinea pig								
Skull			4		1	1		**6**
Mandible		5			3	3	3	**14**
Fish							4	**4**
Vertebra	89	6	17		93	120		**325**
Unidentified		26	45				28	**99**

The guinea pig (*cavia porcellus)* was another terrestrial animal consumed in the households at El Campanario. The presence of guinea pig coprolites in unit 16-4 and 16-8 indicated that they were raised within the domestic areas. In modern day Peru, especially in the highland, guinea pigs are still raised in homes for consumption. In addition, modern homes usually keep guinea pigs in the kitchen, because of a common Andean belief that they need smoke, and the *cuyeros* (structures in which to keep the guinea pigs) are built of adobe or reed and clay (Morales 1994:132). In the past, Europeans guinea pigs were used not only as food but in medical diagnostics, as sacrifices to the gods, and as part of funerary offerings (Sandweiss and Wing 1997).

7.5. Marine Resources

7.5.1. Shellfish

The shoreline and rocky outcrops on the beach are approximately 1-2 kilometers from the site, which is around one-hour walking distance and it is most likely that El Campanario residents collected marine resources directly. Shellfish remains recovered at El Campanario was composed of gastropods, bivalves and crustaceans. The identification and quantification of gastropods was based on a minimal number of individuals (MNI) by using the apex of every gastropod. In the case of the bivalves and crustaceans the identification and quantification were based on the number of individual specimens (NISP), by identifying the right and left shell in bivalves and crabs were quantified using the claws and carapace (Tables 7.4 and 7.5).

Table 7.4: Minimum number of individuals (MNI) of shellfish species from El Campanario

Species	**Units**									**TOTAL**
	15-1	**16-1**	**16-2**	**16-3**	**16-4**	**16-5**	**16-6**	**16-7**	**16-8**	
Prisogaster niger			36		36		9	33		**114**
Tegula atra	325	67	363	34	464	99	152	653		**2157**
Thais chocolata	10		19	1	20	1	1	3		**55**
Thais chorugta			1		1				5	**7**
Thais haemastoma							4			**4**
Fisurella limbata	58	5	55	11	71	17	21	70		**308**
Fisurella maxima	8		4		4	1	3			**20**
Crab				3	3				7	**13**
Limpets sp			15		15	4			3	**37**
Xantochorus buxea				1	1			3		**5**
Sinum symba								2		**2**
Crepipatella dilatata	1									**1**
Scutalus proteus			1		1			5		**7**

The species of gastropod that was widely extracted for consumption was *Tegula atra*, which accounts for about 1839 individuals, followed by *Fisurella limbata* with 225 individuals and *Prisogaster niger* with 114 individuals (Table 7.6). These species occupied a rocky habitat or biotope within the mesolitoral zone. Other species of gastropods found in low quantities included *Fissurella maxima*, *Thais chocolata*, *Thais Haemastoma*, *Scurria sp.*, and *Sinum symba*. Bivalves were also extracted and consumed at El Campanario and the most common species collected was *Perumytilus purpuratus* which accounts for about 2613 shells, along with *Choromitilus chorus* (525 shells), *Concholepas concholepas* (262 shells), and *Semimytilus algosus* (203 shells).

Table 7.5: Minimum of individual's specimens (NISP) of shellfish species from El Campanario

Specie	**Units**									**TOTAL**
	15-1	**16-1**	**16-2**	**16-3**	**16-4**	**16-5**	**16-6**	**16-7**	**16-8**	
Semele corrugata			18	1	19	12	4	1	7	**62**
Choromytilus chorus		49	144		193	138	1			**525**
Enoplochiton niger	563	9	251	56	316	76	249	155	4	**1679**
Crab (fragments)	80	6	145	74	225	60	15	4		**609**
Concholepas concholepas	49		72	15	87	16	8	15		**262**
Donax obesulus	1		4		4	2	4	5	1	**21**
Serimytilus algosus	9	2	38	20	60	43	17	14		**203**
Perumytilus purpuratus	1313	7	315	101	423	83	203	167	1	**2613**
Scurria parasitica		1	19	4	24	15	5	4		**72**
Protothaca thaca	10		19	10	29	5	2	8		**83**
Mesodesma donasium	1		6		6	1	1			**15**

These four species were most commonly found within rocky habitats or biotope and in the mesolitoral zone. Other bivalve species found in small quantities at the site included *Protothaca thaca* (83 shells), *Semele corrugata* (62 shells), *Donax sp* (21 shells), and *Mesodesma donasium* (15 shells). The two last species were found in a sandy habitat or biotope and in the mesolitoral zone. The majority of species collected by El Campanario inhabitants were found in rocky habitats common on Huarmey shoreline. While there were plenty of sandy areas on the shoreline allowing easy extraction of *Donax sp* and *Mesodesma donasium*, there was clearly a preference for extracting species from rocky biotopes. In addition, 609 crab fragments and 1679 *Echnoplochiton niger* shells were part of the marine resources consumed at El Campanario. These species also live in rocky habitats and their extraction is still important in modern day Huarmey, and heads of households still depend economically on their extraction. The preference for collecting specific shellfish species could have been related to a specialized activity among household residents. It is possible that shellfish specialists extracted a small variety of less accessible but profitable mollusks than an unspecialized collector (Moore 1985)

Table 7.6 Species based on their biotope and zones from El Campanatio (S-M: sandy-muddy; R: rocky; M: mangrove and SU: supralittoral; ME: mesolittoral; IN: infralittoral), *adapted from Guzman et al. 1998.*

Species	BIOTOPE			ZONES		
	S-M	R	M	SU	ME	IN
Semele corrugata	X					X
Prisogaster niger		X			X	X
Tegula atra		X			X	X
Thais hocolata		X				X
Thais chorugta		X				X
Thais haemastoma		X				X
Fisurella limbata		X			X	
Fisurella maxima		X			X	
Choromytilus chorus		X			X	X
Enoplochiton niger		X			X	X
Crab		X			X	X
Concholepas concholepas		X			X	X
Donax obesulus		X			X	
Limpets sp		X			X	
Serimytilus algosus		X			X	
Perumytilus purpuratus		X			X	X
Scurria parasitica	X				X	
Protothaca thaca		X				X
Mesodesma donasium	X				X	X
Xantochorus buxea	X			X		
Sinum symba	X					X
Crepipatella dilatata		X				X

However, at the Casma site of El Purgatorio, located inland, commoners in sector B obtained marine resources and access to agricultural lands through the elite residing in sector A (Pacifico 2014). The presence of shellfish at the Casma site of Cerro la Cruz indicated that marine resources were an important part of the diet; however, it was difficult to determine if shellfish consumption was related to local extraction or the result of an exchange system with fishing communities (Vogel 2012). According to Zavaleta and Sanchez (2011), the geological formation located along the Huarmey shoreline contains abundant marine resources such as fish and shellfish. Extraction of marine resources was an important economic activity, since the Huarmey Valley had limited agricultural area. In addition, the extraction of marine resources was conducted by specialists who were overseen by the elite (Zavaleta and Sanchez 2011:145).

7.5.2. Fish

Today, fishing is a very important economic activity in Huarmey and most of it is carried out by traditional methods. Men are usually in charge of fishing, while women sell the fish to other households or to the local market. On the other hand, industrial fishing is oriented to the extraction of anchovetas (anchovies) and pejerrey (silverside fish).

During excavation at El Campanario, various fish vertebrae, along with fishing nets, were recovered in different units. It is clear that inhabitants from El Campanario participated directly in extraction of marine resources. Unfortunately, identification of the fish species could not be conducted due to budgetary and time constraints. However, the distribution of fish remains at the site suggested that they were consumed in small quantities and the bones discarded within the households. The presence of fishing nets at the site suggested that fishing equipment was keep within the household. On the coast, fishing nets were commonly made of cotton, allowing the manufacture of different size nets for different uses. Ethnohistorical sources describe names of nine varieties of fishing nets used on the coast (Rostworowski 1981). These names referred to the type of fish that fishermen wanted to catch. While fishhooks were also important for fishing activities, they were absent in the material recovered at the site. David Pacifico (2014) reported the presence of fishing nets in the commoners' area (sector B) of El Purgatorio and, while marine resources could have been redistributed by the elite, it is also possible that some household members participated directly in fishing activities. In addition, the relationship between Casma sites and fishing communities is uncertain, as well as whether access to marine resources was a form of taxation by the Casma state or merely the result of a complex exchange network controlled by the local elite.

7.6 Ceramics

Ceramic sherds are the most common type of artifact found at archaeological sites. The first step in the study of the ceramic assemblage from El Campanario consisted of analyzing 3637 diagnostic sherds which included pottery rim fragments, bases, painted sherds, sherds with press-molded and incise decoration, and fragments of effigies (Table 7.7). These sherds were selected in order to observe their attributes, such as rim orientation (everted or convex), rim diameter, vessel form, and decoration. Based on this analysis, various types of vessels were identified and grouped into categories according to their inferred function. The pottery types describe here were classified based on the ceramic types identified by Enrique Zavaleta and Rocio Sanchez (2017) at El Campanario, the work of David Pacifico in domestic areas at Sector B of El Purgatorio site and the work of Robin Cutright (2009) in domestic areas at the site of Pedregal. In addition, typological analysis developed by Luis Lumbreras (2005) and Roger Ravines (1998) were used to describe the pottery styles found within the domestic areas at El Campanario.

Table 7.7: Ceramic types found at El Campanario

Ceramics	**Units**									**Total**	**%**
	15-1	**16-1**	**16-2**	**16-3**	**16-4**	**16-5**	**16-6**	**16-7**	**16-8**		
Pedestal Bowl	92	87	368	85	129	66	39	37	81	983	27.1
Bowls	1	6	35	7	12	6	9	7	6	89	2.5
Cups	11	63	207	60	83	41	41	35	51	592	16.3
Jar	21	26	104	31	53	27	11	13	37	323	8.8
Olla	1	22	92	30	51	15	20	18	16	265	7.2
Tinajas	2	24	4	30	6	3	2	15	87	107	2.9
Handles	5	21	118	28	23	14	6	29	21	265	7.3
Ceramic Mold	1		5	4	2					12	0.3
Tortero					4	1	2	1	1	9	0.2
Figurine				1	2		2		1	6	0.1
Press-Molded	44	65	199	48	132	48	34	22	44	636	17.4
Incise	6	26	94	8	39	36	18	8	17	252	6.9
Serpentine Applique	4	1	12	2	6	4	0	2	1	32	0.8
Painted	11	3	28		11	2	4	7		66	1.8
Total	199	344	1266	334	553	263	188	194	363	**3637**	**100**

7.6.1. Vessel Forms

7.6.1.1. Bowls

Bowls are open vessels with everted rims and pedestal bases and used primarily as serving vessels, perhaps for stew or soup (Cutright 2009:238). Bowls, along with plates and *kero* cups, were fineware items used for ritual and other non-utilitarian functions (Vogel 2003:232). At El Campanario, 457 redware and 471 blackware pedestal bowls were recovered from different units. Rim diameter range from 16 to 24cm and the pedestal bowl height from 7 to 12cm. In addition, 11 redware and 19 blackware pedestal bowls had press-molded decoration on the external base. Rim fragments of pedestal bowls showed painted decoration on the interior part of the bowl, and only a few pedestal bowls sherds showed press molded decoration on the external walls as well as a combination of painting and press-molded designs.

Most of the redware pedestal bowls were not polished before firing; some of them have a red slip on the interior surface of the bowls along with painted decoration. Blackware pedestal bowls were commonly polished on the interior surface before firing and do not show evidence of painted decoration. Besides pedestal bowls, remains of another type of bowl with a convex base was found. There was a total of 40 redware and 51 blackware bowls of various sizes. Rim diameter range from 14 to 20 cm and the bowl height from 4 to 6 cm (Figure 7.9). Pedestal bowls appeared commonly in every unit excavated which suggests that this type of vessels was widely used. They were also libation vessels for *chicha* consumption and also status symbols (Pacifico 2014; Vogel 2003).

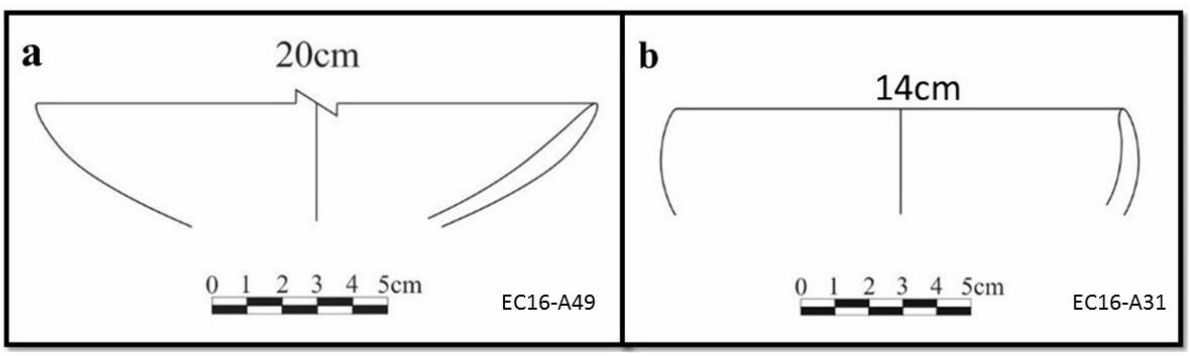

Figure 7.9: Bowls; a) everted rim, and b) convex rim

7.6.1.2 Cups

Cups are cylindrical, open, deep vessels with everted rims and a flat base. Cups are different from bowls at El Campanario because bowls have pedestal and convex bases. In the Andes, cups were most commonly used during important events and at feastings for serving drinks (Bray 2003; Cook and Glowacki 2003; Vogel 2012). Cups recovered consisted of 222 redware and 363 blackware. Rim diameter ranged from 16 to 20 cm and the cup height from 11 to 15 cm (Figure

7.10). Most cups, redware and blackware alike, were polished before firing and, in some cases, a red slip was added onto both the interior and exterior surfaces. In addition, six blackware cups had press-molded decoration on the base, consisting of dots within a circle. Another type of decoration consisted of parallel, horizontal bands on the exterior surface of blackware cups. Because only six sherds were recovered, it is possible that this type of decoration was restricted to blackware cups. Only one cup fragment showed painted decoration of black and cream lines over a reddish surface on the exterior wall. The only complete blackware cup found was associated with two complete gourd bowls containing remains of human hair, possibly left at the site as an offering at the time of abandonment.

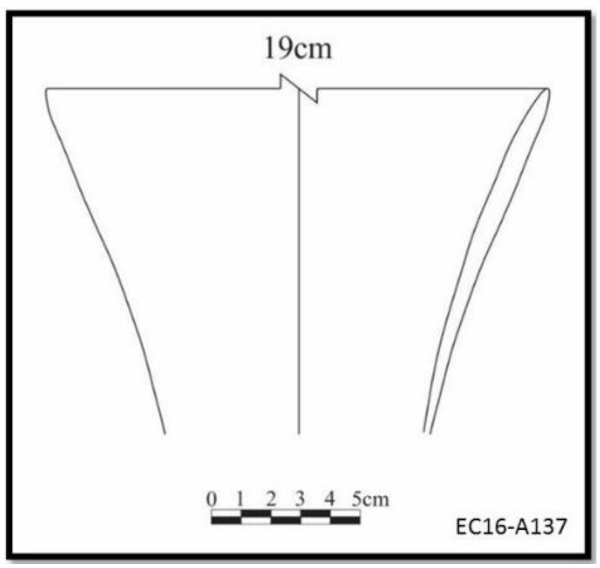

Figure 7.10: Cups

7.6.1.3 Jars

Jars are long, globular vessels with long necks and have a round, restricted opening at the top. The absence of dark coloration on jars suggests that they were not used for cooking but rather for storing and serving (Cutright 2009:236; Pacifico 2014:206). Some blackware jars had molded faces on the neck which perhaps showed the importance of this type of vessel (Vogel 2003, 2012).

at El Campanario 323 jar fragments (8.8%) were found in the units excavated. Rim diameter range from 8 to 14 cm (Figure 7.11). Some redware jars had press molded decoration near the neck or on the body, while others had incision decoration. The jar fragments found at the site, both redware and blackware, were not polished before firing and there is no evidence of any treatment on the interior surface. Only one had a red slip on the exterior surface, and the handle shows black and cream lines above the red slip.

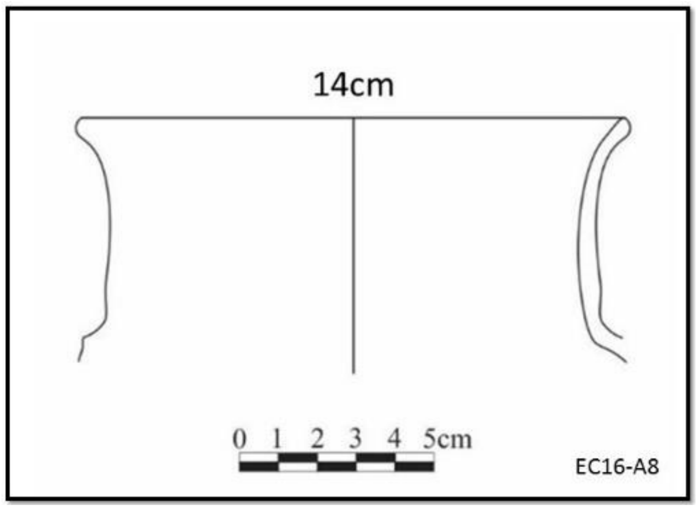

Figure 7.11: Jars

7.6.1.4 *Tinajas*

Tinajas are large vessels that have thick walls, with a wide opening at the top and flat lips. Based on the pottery sherd recovered at El Campanario *tinajas* are tall and ovaloid in shape, and while their opening is wider compared to other vessels, these openings are narrow in relation to the body of the *tinaja*. They are used to store liquids or food, and were essential in *chicha* production (Pacifico 2014:206). *Tinajas* were commonly associated with the *chicha* fermentation process and also for the storage of liquids (Delibes and Barragan 2008; Moore 1989; Shimada 1994). At El Campanario, *tinajas* ranged from 35 to 62 cm in diameter and 107 fragments (2.9%) of redware and plain *tinajas* were found (Figure 7.12). It is possible that the large *tinajas* were used for *chicha* production while the smaller ones were used to store food and drinks.

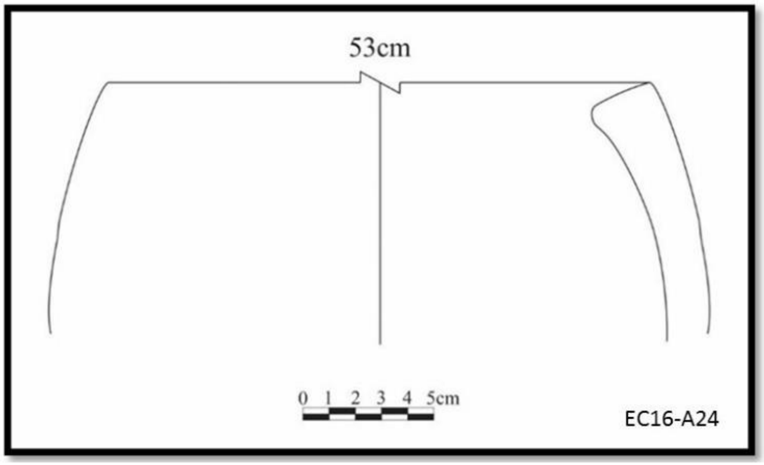

Figure 7.12: Tinaja

7.6.1.5 *Ollas*

Ollas are globular vessels with wide necks and a round opening at the top (Ravines 1989:230). They were most commonly used for cooking or for storage. Parts of the vessels had dark coloration, because during cooking they were directly exposed to fire (Cutright 2009:234; Pacifico 2014:234). Although *ollas* were more commonly associated with household activities, they were also used as part of funerary rituals, indicating their importance in the Andean world (Cutright 2005). At El Campanario, redware *ollas* were the most common, and some had dark coloration on the exterior surface; it is most likely that they were directly exposed to fire, indicating their use in food preparation. Rim diameter ranged from 10 to 24 cm and *olla* height from 12 to 20 cm (Figure 7.13). At El Campanario, there were two types of *ollas*; neckless *ollas* from 46 rim fragments of 15 cm in diameter, and cambered *ollas* of 11 cm in diameter and showing incise decoration on the handle or the neck of the vessels. In addition, twist and incise handles were also attached to *ollas* as part of their decoration.

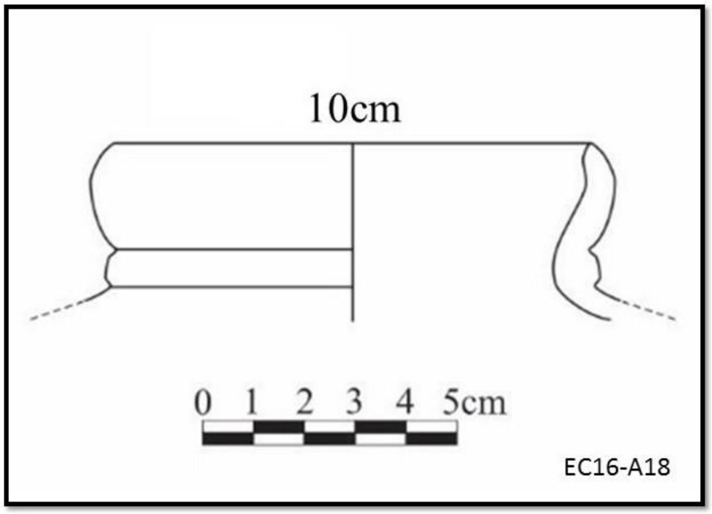

Figure 7.13: Olla

7.6.1.6 Ceramic Molds

Ceramic molds, along with polishing stones and wooden tools, were found at the Casma sites of Cerro La Cruz, El Pugatorio, and Ten Ten. These molds were used to manufacture jars, face-neck jars, ollas, stirrup-spout bottles and possibly bowls (Vogel 2016:166). At El Campanario, twelve mold fragments were recovered, but only one was possibly used to produce face-neck jars, while the others had the line and dot design and used to produce jars or *ollas*. One characteristic of Casma ceramic molds is the outside decoration using the press-molded technique, and while this might have been used as a visual notation by the ceramic artist, some molds did not have the same design on the exterior and interior (Vogel 2012). However, two molds found at El Campanario did show external dots and line decoration; in addition, on the interior of the mold were patterns resembling the dot and line design.

7.6.1.7 Others

Other types of ceramic artifacts were also recovered during excavations at El Campanario. Small figurines depicted humans or animals, and of the three figurines found at the site, one showed a female figure with both hands on her abdomen and the other two were oval with polychrome decoration (Figure 7.14). Figurines were small portable items which may have been used as ethnic identity markers commonly associated with household rituals. (Ringberg 2008). Another object discovered was a small globular container with a handle on one side and decorated with incisions (circles and dots) as well as an anthropomorphic representation on the top.

Figure 7.14: Other Clay Artifacts; a) small zoomorphic container and b) figurine.

7.6.2. Vessel Decoration

<u>7.6.2.1 Press-Molded</u>

Press-molded was the decorative technique used in the manufacture of pottery. Chimu ceramics, for example, have in some cases low relief press-molded geometric designs (Donnan 1997:41). Molded ceramics refers to the pottery formation technique used to manufacture bowls, bottles, jars among others. The pottery manufacture at the sites of Farfan and Tucume consisted of the use of three molds segments in which the press-molded decoration was part of the body mold of the vessel (Levine 2011:173). The most common style of pottery decoration found at El Campanario sites was the press-molded observed on 636 fragments which constituted 17.4% of the total pottery sherd sample. Press-molded designs included zoomorphic and anthropomorphic figures along with geometric designs, swirls or spirals, circles and triangles (Vogel 2003, 2011, 2016). At the site of El Purgatorio, there were ceramic molds with the circle and dot motif commonly associated with the Casma Incised (Vogel 2011, 2016). Press-molded decoration at El Campanario consisted mostly of a combination of lines and dots where lines were used to mark areas on the exterior surface of the pottery, such as squares or triangles, and filling those areas with dots (Figure 7.15). Other fragments contained individual lines or dots on the exterior surface. Zoomorphic designs, such as marine birds representing possibly pardelas and guanay, which can be found today on the shoreline. Other designs included sea shells (Concholepas concholepas) whereas other fragments had a crescent-shaped design along with circles with pointy edges.

Figure 7.15: Press-molded ceramic decoration at El Campanario.

Based on the ceramic molds found at the site, it is likely that press-molded decoration was commonly used during the process of pottery production. These decorations were used to decorate the bodies of jars, *ollas*, and, in some cases, the base of pedestal bowls and cups. Press-molded decoration on pedestal bowls and cups appeared mostly at the bottom, where dots, lines and birds were represented. However, there were some pedestal bowl fragments with press-molded decoration at the bottom and on the walls, as well as some cups with two horizontal lines on the external walls. In addition, there were effigy fragments produced using molds and were most likely part of figurines or face-neck jars.

7.6.2.2 Incised

The most common design associated with the Casma Incise consisted of incised circles as well as circles and dots in rows forming a rope around the neck of the vessels (Vogel 2003, 2011, 2016). At El Campanario, Casma Incise comprised 252 fragments (6.9%) consisting of circles, lines, and a combination of circles and dots along with lines located on the exterior surfaces of the vessels (Figure 7.16). The circle and the line decorations were also used around both the necks and handles of *ollas*. Geometric incisions (especially triangles) and dots along with circular incisions appeared on large jar walls. There were also zoomorphic applications on the exterior walls of *ollas*, consisting of an application decorated to resemble a frog on each side of the vessels; in addition, there was one fragment with a bird application along with incise triangles and dots which probably decorated the exterior walls of ceramic vessels. Twisting handles was a typical decorative technique related to the Casma Incise and some fragments contained incise circles on the handles. Another typical Casma decoration was the serpentine appliqué, and while Sheryl Dagget (1983) considered this as a separate Casma style, in this dissertation it will be included as part of the Casma incise. At El Campanario, only 32 fragments were recovered from the units; the design was restricted to the "S" shape applications along with incise circles which decorated the exterior of large jars.

Figure 7.16: Incise Decoration from El Campanario

7.6.2.3 Painted

The most common painted or fineware Casma pottery is known as Black-White-Red; however, this style is absent in the ceramic assemblage from El Campanario. Painted pottery sherds numbered about 66 fragments (1.8%), which is significantly low in comparison to the Press-molded and Incise decoration. One type of decoration occurring on handles and occasionally on jars consisted of black geometric lines painted on a white or cream surface. This type of decoration appeared at the surface level and was probably related to later occupation at the site, probably the Chimú-Inca presence. The other type of decoration consisted of black geometric designs and motifs on a white surface situated on the superior edge of the pottery vessel, the rest of the vessel body having a red or orange surface. Vertical black and white lines were found on the interior rim of pedestal bowls, and in some cases on the base of the bowl. Another design was the semicircular black and white lines and black lines with white dots which were placed horizontally along the interior surface of the bowl rim. In addition, a semicircular area was embellished with a black painted line and white paint, creating a zigzag motif, or, in other cases, by portraying a face. Black and white vertical lines were also found on the exterior rim of plates and on the exterior side of a cup. Another design consisted of the fret or key pattern embellished with black lines above a white surface on redware ceramic vessels. This decoration appeared on ceramic fragments, and it is possible that they were used to decorate the body of the ceramic vessel.

The painted ceramic observed at El Campanario may have been stylistic continuation from the Middle Horizon. This painted decoration was most likely a local imitation of the Huamanga style of the same period. The Huamanga style is defined as the secular style of the Middle Horizon, commonly associated with domestic pottery (Anders 1986; Cabrera and Ochatoma 2016). This style possibly appeared in Ayacucho a little after the beginning of the Middle Horizon and continued until the end of this period (Cabrera and Ochatoma 2016). The Huamanga style also appeared at other Andean sites along with fine Wari style pottery (Glowacki 2005; Jennings and Yepez 2015; Owen 2007). Other decoration appeared to be influenced by the Chancay style of the north-central coast of Peru, especially the Huaura black-white-red (Ravines 2011:492-493). In addition, there are some fragments with black on white decoration which might have similarities to the Chancay black on white (Figure 7.17).

Figure 7.17: Painted ceramic fragments from El Campanario

7.7 Textiles

7.7.1 Raw Material

The raw material of fibers used in Andean textiles were either vegetal or animal. In the central Andes, the use of cotton appeared in preceramic fabrics. However, other kinds of vegetal or plant fibers were used during different times periods, such as cabuya, totora, and reeds, among others, materials used for their flexibility and malleability (Figure 7.18). As for animal fiber, the hair of camelids has always been used (vicuña, alpaca, guanaco and llama), vicuña hair being the finest and llama hair the thickest. It is possible that the need for camelid fiber triggered the domestication of llamas and alpacas, which occurred during the Early Horizon (Bird 1979:15).

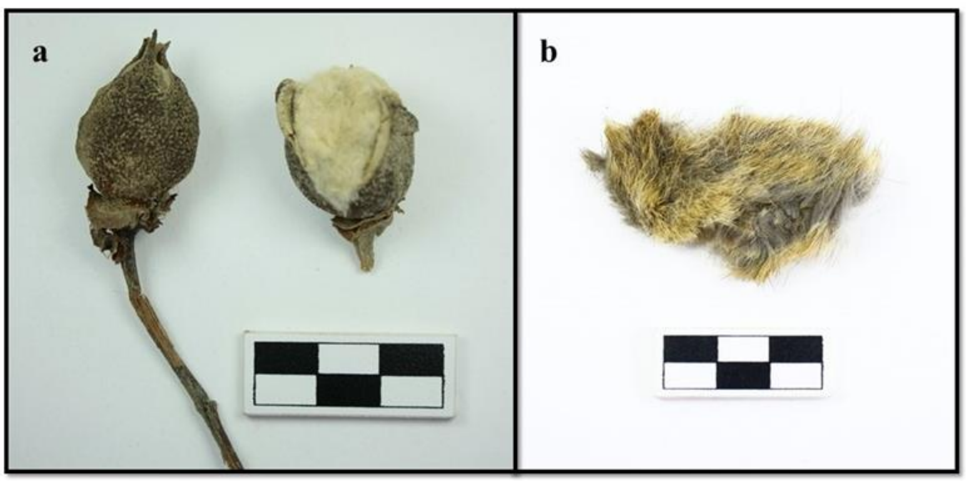

Figure 7.18: Types of fiber; a) native cotton and b) camelid fiber

At El Campanario, 173 cotton bolls, along with 55 cotton seeds, were recovered within the household context. In addition, cotton fluff and camelid fibers were also recovered. The species of cotton used most appeared to be the white native species. However, it is still unknown if the camelid fibers were from llamas, domesticated on the north coast of Peru, or other camelid species such as alpaca and vicuña. Textile analysis of from domestic context at El Campanario was conducted by Diego Fernandez Siccha as part of his license thesis at the University of Trujillo (Peru).

7.7.2 Spinning artifacts

Artifacts associated with spinning were found, such as spindles of various sizes (Figure 7.19). Most of them still contained threads of cotton and camelid fiber. Spindle whorls were absent at the site; however, various *torteros* (object made mostly of ceramic fragments or stones which is placed at the end of the spindle) were recovered. These *torteros* were made by perforating a hole in a fragment of broken pottery. Looms or other artifacts associate with weaving were not found at the site, inferring that those artifacts were transported to new areas by household members at the abandonment of the site, or possibly buried with their owners.

Figure 7.19: spindle found at El Campanario

7.7.3 Weaving Techniques

The most common technique at El Campanario employed plain textile in different variants of 1x1, 1x2, and 2x2. This technique is employed on a loom where the warp and weft threads are interlocked and continuous throughout the length and width of the textile. It implies that both the warp and weft threads are visible.

The second weaving technique used at the site was tapestry, with two variants. The grooved tapestry technique is characterized by grooves on the sides of the figures. The pattern of a color returns to a certain thread of the warp, while the contiguous becomes the next thread. The third technique is the interlaced tapestry consisting of manipulation of the weft threads to avoid the slots on the edges of colored areas.

There were also a small number of fragments that showed other weaving techniques, such as the complementary warp in which two or more threads of different colors are twisted. The raster reps were usually made on a loom, where the warp and weft threads were interlocked continuously throughout the length and width of the textile, the only visible threads being those of the weft. Warp listing is the technique in which the warp goes from end to end and instead of turning around the textile; warp threads of different colors are alternated. In its simplest form, this leads to the creation of lists or stripes that intersect with different patterns. Finally, the knot back and cape technique consisted of element A rotating around element B to hold it, and then element A making a knot in the created fabric. It is the only type of knotting that was found in the fishing nets at the El Campanario site.

7.7.4 Spun Thread

The twisting of the fibers is done through the spinning process. There are two types of threads: one is torsion, when the fibers are turned to the right, forming threads with spun in "S", (Figure 7.20) and the other, when the fibers are turned to the left to create threads with twist in "Z". These two types of threads, in turn, create new threads through a twisting process, consisting of re-twisting of two threads, either spun "Z" or "S", making retaliation in the opposite direction. For example, two threads with "S" twist are twisted into "Z" and two threads with "Z" twist are twisted into "S", called 2sZ and 2zS respectively. The results of yarn analysis in textile fragments of Sector C of the El Campanario site show a preference for using "S" twisted yarn (111 samples) in both warp and weft. The second most preferred form was the spun "Z" (27 samples). In addition, several textiles showed a combination of weft threads employing both "S" and "Z" spun (7 samples), spun 2zS (2 samples), and spun 2sZ (2 samples).

Figure 7.20: Threats with “S” spun found at El Campanario

7.7.5 Completion Techniques

Completion techniques were a very important part of the embellishment of garments or textiles, since embellishment implies personalization of the artifact, thus fulfilling a representational dimension. This became clear at the moment of establishing the cultural assignment to a piece of textile, since the artisan uses characteristics according to the beliefs of the culture into which they were inserted (Hoces de la Guardia 2006). To achieve this goal, completion techniques have been divided into two subgroups, Union Techniques and Reinforcement Techniques.

7.7.5.1 Union techniques

In this analysis, only fragments of textiles where joining techniques were observable were considered, due to the fact that there was no complete piece, and most of the textile fragments did not display these techniques. At El Campanario, only two types of joining techniques were found, the most used, being practical and easy to learn, was the diagonal stitch, found in textiles ranging from the earliest periods to the Late Horizon (Hoces de la Guardia 2006).

The second technique, of union, was found in any manual or sample of consultation that defines it. This is why it has been named *borde entrelazado* (interlaced edge) found only in a single fragment of textile of a mixed manufacturing technique (Plain Textile and Warp Reps) which consisted of joining the edges of two textiles of different manufacture through the interlacing of their threads.

7.7.5.2 Reinforcement Techniques

Because no complete piece was available, in most textile fragments this type of technique could not be identified. The most common reinforcement technique was the *encandelillado,* while the second most common was the *Doblez de orilla con puntada de festón de ojal*.

7.7.6 Analysis of Style

To carry out stylistic analysis of the sample of textile fragments from sector C of the El Campanario site, we proceeded to select in detail those textile fragments that had decoration or designs on their surface.

7.7.6.1 Bands

Bands were characterized by using yarns of various colors: red, green, yellow, cream, brown, white and black. Many of these colors were also used during the Middle Horizon by the Wari culture, a culture that had an opaque color palette (Varillas 2016). Some bands had geometric designs, forming horizontal or vertical lines, horizontal and vertical bands and rectangular or square figures. These shapes were achieved by interleaving yarns of different colors, achieving designs within the same piece of cloth. All these characteristics show that the Casma culture of the Huarmey Valley maintained knowledge acquired through cultural traditions developed in the Middle Horizon. One of the bands elaborated its design by interlacing two yarn colors (red and beige), creating zoomorphic figures designed horizontally and looking in opposing directions, right and left. The design shows two panels, and in each are four snakes, two with the head facing right and two with the head facing left. In the left panel the snakes are delineated by red threads, while their fill is composed of beige threads and dots of red threads. For the right panel the distribution of colors is the opposite, the snakes delineated by white threads, while the filling and stitches with beige threads (Figure 7.21).

Figure 7.21: Textile Bands.

7.7.6.2 Tapestry

As for the only tapestry fragment found that identifies designs or decorations, we saw that red, green and cream threads were used, which, like the tapes (Figure 7.22). The design presented by the tapestry fragment was achieved using geometrical and stepped figures, its structure elaborated by the slotted tapestry technique. At first, both the design and the structure were associated with the highland cultural traditions, but if a thorough analysis is carried out, one notices that the Casma culture also used this type of design in other cultural materials, one being the Casma pottery style called Black-White-Red, having geometrical and stepped figures in its decoration (Vogel and Pacifico 2011).

Figure 7.22: Fragment of a Tapestry found at El Campanario site

7.8 Lithic Artifacts

7.8.1 Grinding Stones

Food processing was an important activity in households at El Campanario. The most common artifacts associated with food preparation were the *batan* and *chungo*. The *batan* is a large slab where food or other material was placed for grinding, while the *chungo* was the small round stone used for grinding. At El Campanario, *batanes* were absent and was only one *chungo* was found in unit 16-3. The absence of *batanes* could indicate that residents took their grinding equipment with them when they abandoned the site, since large stones were scarce.

Small stones were also found at El Campanario, ranging from 10-15 cm in size. All of these stones were fragmented and probably left behind by residents. The smooth pointed edge could indicate that they were used as pestles for grinding (Figure 7.23). Tools used in the manufacture of lithic tools or lithic debitage were absent. However, it is still possible that the manufacture of lithic tools was an important activity in the household.

Figure 7.23: Stone artifact found at El Campanario

7.8.2 Polishing Stones

Small smooth stones were also recovered (Figure 7.24). These stones were most likely used to smooth surfaces of clay vessels as part of the last stage of pottery manufacture, just before firing. These polishing stones ranged from 2-4 cm in length and were most commonly associated with pottery production. Their presence in almost every unit indicated that pottery production occurred within the household. In addition, several of these stones were found in unit 16-2 near the firing pit likely used as a ceramic kiln.

Figure 7.24: Polishing stones found at El Campanario

7.8.3 Other Stone Artifacts

The excavation also recovered other types of stone artifacts. One was a triangular object 4 cm long, sharpened on both edges and a circular depression on the bottom, indicating the intention to perforate it. The other special object found was a small, smooth stone 3cm long, sharpened to three pointed edges. At this point, the function of these two objects is unclear, but it is possible that they were used as pendants (Figure 7.25).

Figure 7.25: Other Stone Artifacts.

7.9 Other Artifacts

7.9.1 Gourds

Large quantities of gourd fragments (575) were found at the site. Most of them were plain, making it difficult to define their form. Most were shaped into bottles and bowls. Some fragments to be used as bowls were beveled (Figure 7.26 a, b). Two complete ancient gourd bowls used to prepare human hair offerings were found in unit 16-3 (Figure 7.26 c). It is clear that gourds were used not only as serving utensils, but also had religious value. In addition, two gourd fragments were decorated with carved wave designs and lines on the exterior surface.

Figure 7.26: Gourds found at El Campanario a,b) decorated grourds and c) ancient gourds bowls containing human hair

7.9.2 Wooden objects

Wooden objects of various shapes were recovered in most units. Some objects had conical shape, while others had a long and pointed end. They ranged from 8-12 cm long with an average of 4 cm in diameter (Figure 7.27). They were probably manufactured from several types of wood, but their function is unclear. They were possibly were used to seal a bottle and protect its contents, or perhaps merely children's toys. David Pacifico (2014) found similar objects in sector B of the

El Purgatorio site and compared them with a Guaman Poma de Ayala depiction of an Inca boy playing with a similar object (Pacifico 2014: 296).

Figure 7.27: Wooden Objects found at El Campanario

7.9.3 Discs

Other special objects found were discs made from ceramic and gourd fragments (Figure 7.28). Only seven discs were recovered, ranging from 2 to 5 cm in diameter. These discs were not used as toppers for ceramic vessels, being too small to cover openings in the ceramics; rather, they were most likely shapers in the manufacture of pottery (Pacifico 2014: 290).


Figure 7.28: Discs found at El Campanario

CHAPTER EIGHT:

CERAMIC PASTE AND COMPOSITIONAL ANALYSIS AT EL CAMPANARIO

8.1. Ceramic Paste Analysis

The analysis of the ceramic paste was conducted on 300 pottery sherds selected based on their formal attributes (bowls, cups, jars, etc.) and decoration (press-molded, incise, and painted). The purpose of this analysis was to observe the raw materials, specifically tempers, used in the manufacture of pottery. The variation in temper selection were probably related to the technical choices made by potters in the production of specific vessels forms. Analysis of each fragment was conducted using a Dino-Lite digital microscope (Model AM4113T) to obtain mineralogical information on the paste composition in any given sample. The portable characteristic of the Dino-Lite microscope allows researchers to study archaeological materials without transporting them out of their country of origin. In addition, the microscope can be used directly on a pottery sherd without preparation of the sample or cutting the sherd for thin section studies. The use of portable digital microscopes in the Andean area is fairly new (Druc 2015; Rivas Tello 2016) but can provide valuable information in ceramic analysis.

8.1.1. Classification of Paste Groups

Classification of the pottery sherds samples into paste groups were based on the type of temper inclusion, size (Wentworth scale), shape, and grain abundance (Table 8.1). In order to obtain the paste composition of each sample, the digital microscope using various magnifications (25x to 230x) was used on a clean sherd profile. Photographs of each paste sample at different magnifications helped to determine distribution of the inclusions and identify the type of minerals used in clay preparation for pottery production. During ceramic paste classification, a capital letter was assigned to each paste group while numbers were assigned to paste types that belong to each paste group.

Table 8.1: Grain Scale (adapted from Wentworth 1922)

Category	**Type**	**Grain Diameter (mm)**
Gravel	Cobbles	65 - 250
	Pebbles	4 - 65
	Granules	2 - 4
Sand	Very Coarse Sand	1 - 2
	Coarse Sand	0.5 - 1
	Medium Sand	0.25 - 0.5
	Fine Sand	0.125 - 0.25
	Very Fine Sand	0.0625 - 0.125

Identification of minerals used in the preparation of the paste was conducted on a petrographic collection for common minerals such as basalt, quartz, mica and rhyolite. Other inclusions were identified by a Peruvian geologist with experience in archaeological research. The angularity of grains, degrees of grain sorting and grain abundance were determined by visual scales adapted by Isabelle Druc (2015).

Analysis of ceramic paste demonstrated the use of diverse raw materials in pottery production. It is possible that this variation was related to different uses of pottery. Unfortunately, residential areas at El Campanario were only briefly occupied and a study of changes over time was impossible.

8.1.1.1. Paste Group A

This paste group is composed of 23 sherds and characterized by the difference in color on the interior and exterior surfaces of the sherd due to irregular access to oxygen during firing. The group contains inclusions such as quartz, feldspar, silicified rocks, sedimentary rocks, hornblendes and mica and subdivided into four paste types based on the size of the inclusion and sorting (Figure 8.1).

Paste Type 1: This is a sandy clay with milky quartz, silicified rocks and hornblendes inclusion. The inclusions are well sorted and subangular in which coarse-size inclusions account for 6%, while medium-size inclusions are around 45%.

Paste Type 2: This is a sandy clay with feldspars, milky quartz and sedimentary rocks inclusions. The inclusions are well sorted and subangular in which coarse-size inclusions account for 6%, while medium-size inclusions around 45%.

Paste Type 3: This is a sandy clay with feldspars, milky quartz, sedimentary rocks, and mica inclusions. The inclusions are well sorted and subangular in which very-coarse-size inclusions account for 3%, while coarse-size are 30% and medium-size inclusion around 40%.

Paste Type 4: This is a sandy clay with feldspars, crystal quartz, and volcanic rock inclusions. The inclusions are moderated, sorted and subangular in which very-coarse-size inclusions account for 4%, while coarse-size 40% and medium-size inclusions around 20%.

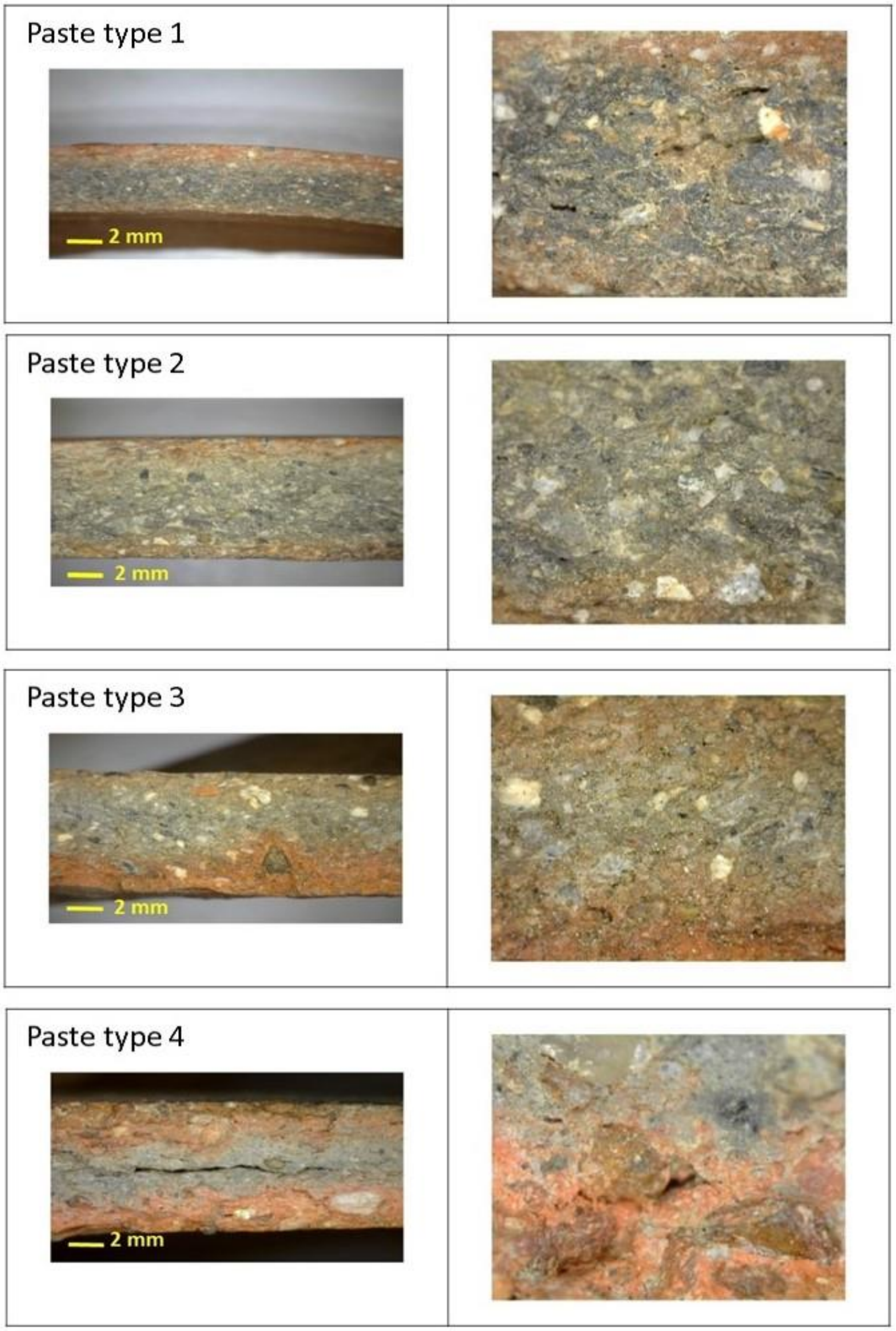

Figure 8.1: Paste Group A

8.1.1.2. Paste Group B

This paste group is composed of 100 sherds and characterized by an even reddish color throughout the paste due to even exposure to oxygen during firing. This paste group contains inclusions such as quartz, andesite, rhyolite, volcanic rocks, and mica. The group was subdivided into four paste types based on the size of the inclusion and sorting (Figure 8.2).

Paste Type 5: This is a sandy clay with milky quartz, andesite, rhyolite, and volcanic rock inclusions. The inclusions are well sorted and subangular, in which very-coarse-size inclusions account for 2%, while coarse-size inclusions are around 30% and medium-size inclusions around 25%.

Paste Type 6: This is a sandy clay with milky quartz, rhyolite, and volcanic rocks inclusions. The inclusions are well sorted and subround, in which coarse-size inclusions are around 10% and medium-size inclusions are around 40%.

Paste Type 7: This is a sandy clay with milky quartz, silicified rock, and volcanic rocks inclusions. The inclusions are well sorted, subround and subangular, in which coarse-size inclusions are around 5% and medium-size inclusions around 45%.

Paste Type 8: This is a sandy clay with milky quartz, silicified rock, volcanic rocks, and mica inclusions. The inclusions are well sorted and subangular, in which very coarse-size inclusions account for 15%, while coarse inclusions around 20% and medium-size inclusions around 30%.

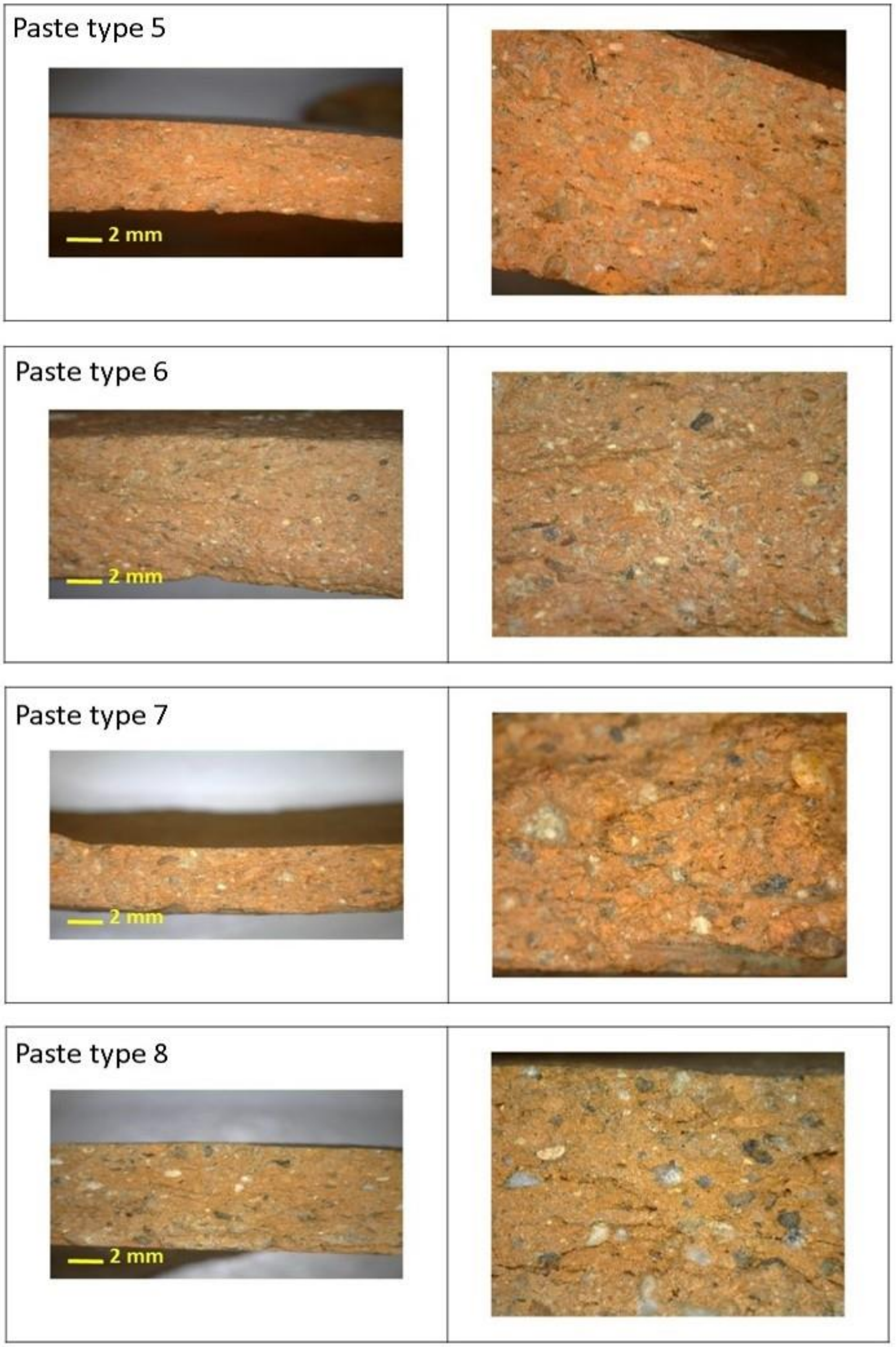

Figure 8.2: Paste Group B

8.1.1.3. Paste Group C

This paste group is composed of 30 sherds and characterized by a light brown color throughout the paste due to even exposure to oxygen during firing. The paste group contains mixed inclusions of basalt, quartz, rhyolite, volcanic rocks, and mica and subdivided into two paste types based on the size of the inclusion and sorting (Figure 8.3).

Figure 8.3: Paste Group C

Paste Type 9: This is a sandy clay with milky basalt, quartz, silicified rock, volcanic rock, and mica inclusions. The inclusions are well sorted and subangular, in which very coarse-size inclusions account for 5%, while coarse inclusions around 15% and medium-size inclusions around 25%.

Paste Type 10: This is a sandy clay with milky basalt, quartz, sedimentary rock inclusions. The inclusions are well sorted, subround and subangular, in which very-coarse-size inclusions account for 10%, while coarse inclusions around 15% and medium-size inclusions around 20%.

8.1.1.4. Paste Group D

This paste group is composed of 66 sherds and characterized by a light orange color throughout the paste due to even exposure to oxygen during firing. The paste group contains mixed inclusions, rhyolite, andesite, volcanic rock, and hornblende. This group was subdivided into two paste types based on the size of the inclusion and sorting (Figure 8.4).

Figure 8.4: Paste Group D

Paste Type 11: This is a sandy clay with rhyolite, hornblende, and andesite inclusions. The inclusions are well sorted, subround and subangular, in which medium-coarse-size inclusions account for 15%, while fine inclusions around 35%.

Paste Type 12: This is a sandy clay with rhyolite, volcanic rock, and sedimentary rock inclusions. The inclusion are well sorted and subround in which medium-coarse-size inclusions account for 5%, while fine inclusions around 40%.

8.1.1.5. Paste Group E

This paste group is composed of 38 sherds and characterized by a light orange color throughout the paste due to even exposure to oxygen during firing. This paste group contains mixed inclusions of quartz, andesite, volcanic rock, and hornblende and was subdivided into two paste types based on the size of the inclusion and sorting (Figure 8.5).

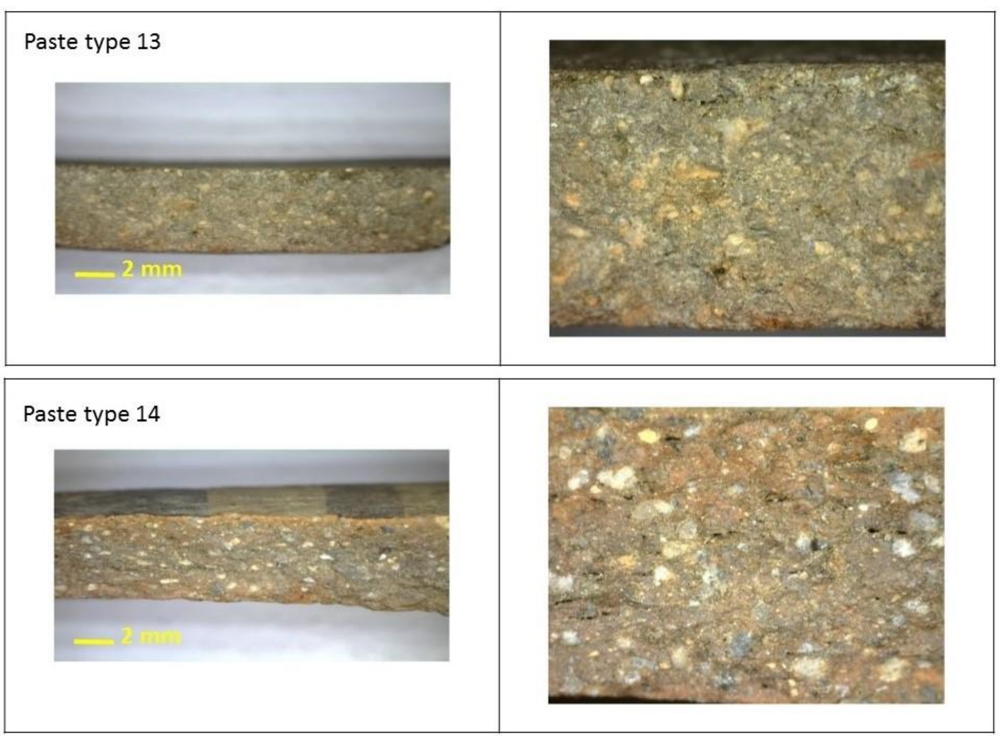

Figure 8.5: Paste Group E

Paste Type 13: This is a sandy clay with rhyolite, hornblende, and andesite inclusions. The inclusions are well sorted, subround and subangular, in which medium-coars- size inclusions account for 15%, while fine inclusions around 35%.

Paste Type 14: This is a sandy clay with rhyolite, volcanic rock, and sedimentary rock inclusions. The inclusions are well sorted and subround in which medium-coarse-size inclusions account for 5%, while fine inclusions around 40%.

8.1.1.6. Paste Group F

This paste group is composed of 43 sherds and characterized by a dark grey color throughout the paste due to limited exposure to oxygen during firing. This group contains inclusions of basalt, quartz, volcanic rock and occasionally mica. This paste group was subdivided into three paste types based on the size of the inclusion and sorting (Figure 8.6).

Paste Type 15: This is a sandy clay with basalt, quartz and volcanic rock inclusions. The inclusions are well sorted and sub-round in which medium-coarse size inclusions account for 10%, while fine inclusions around 30%.

Paste Type 16: This is a sandy clay with basalt, quartz, and volcanic rock inclusions. The inclusion are well sorted, sub-angular and sub-round, in which coarse-size inclusions account for 20%, while medium-coarse inclusions around 30%.

Paste Type 17: This is a sandy clay with basalt, volcanic rock, and mica inclusions. The inclusions are well sorted, sub-round and sub-angular, in which coarse size inclusion account for 15%, while medium-coarse inclusions around 30%, and fine inclusions around 20%.

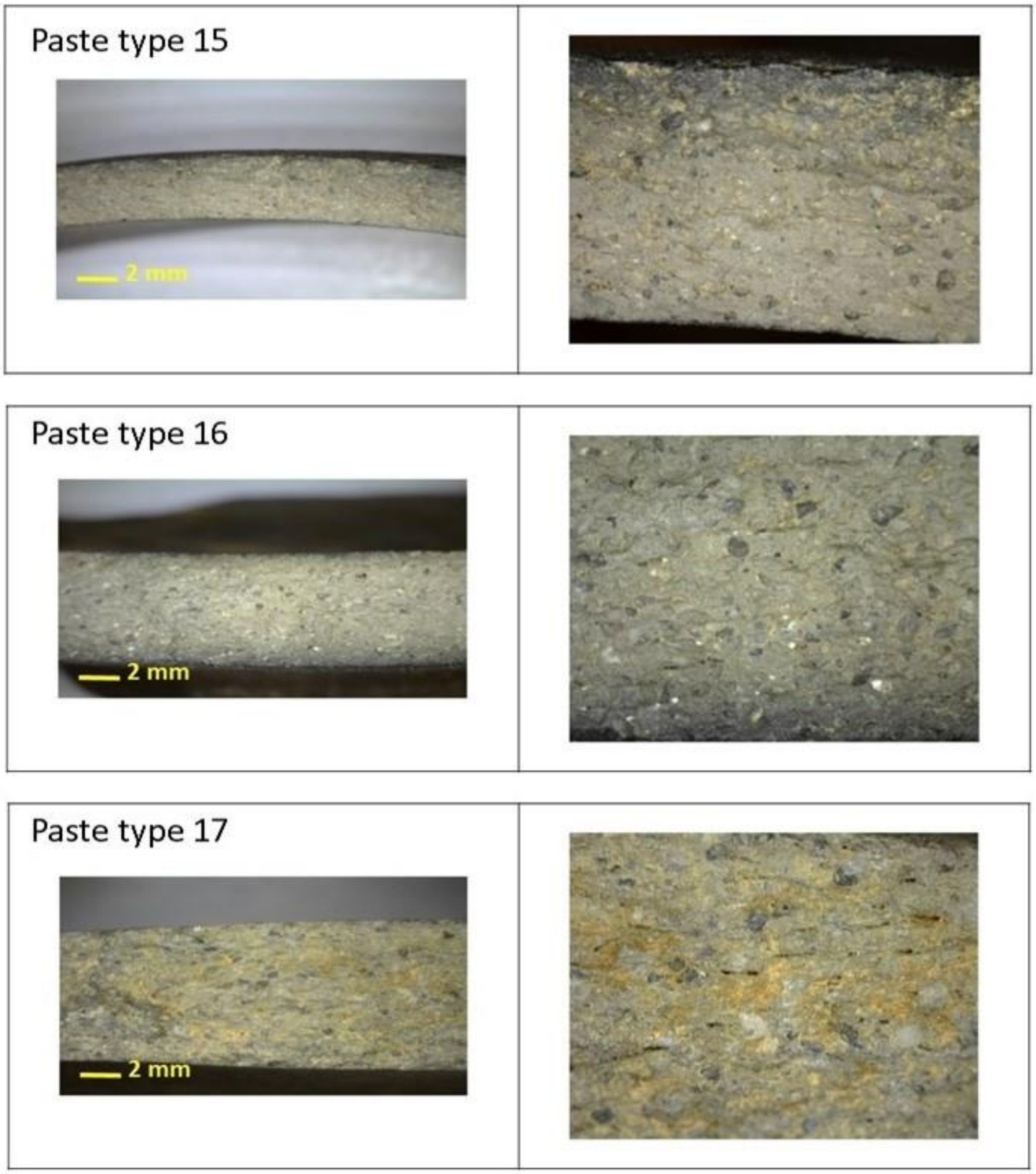

Figure 8.6: Paste Group F

8.1.2 Ceramic Paste Composition and Geological Sources in Pottery Production

The paste analysis of 300 pottery sherds has allowed me to identify six paste groups. Group A was found in *ollas*, jars and decorated incised and press-molded sherds. In the case of Group B, which is the largest with 33.3% of the total sample size and comprises all vessel forms including *tinajas* and ceramic molds as well as painted ceramic sherds (Table 8.2). In addition, Groups C, D and E also include the same ceramic forms and decoration as Group B. The last paste group (Group F) is composed mostly of blackware ceramics and includes bowls, pedestal bowls, cups, jars, and some press-molded decoration.

The information of the pottery paste composition and the geological information presented in Chapter 5 were used to determine the possible procurement areas for pottery production within the Huarmey Valley. Most paste groups contain a combination of sedimentary rocks, andesite, and volcanic rocks. Sedimentary rocks and andesite can be found in the Zorra Formation, which can be found in both sides of the valley and in the proximities of the El Campanario site. Volcanic rocks are more commonly found in the Junco formation, which is located 5-6 km inland from El Campanario, near this geological formation other settlements possibly related to the Late Intermediate Period were previously reported.

Table 8.2 Ceramic Paste Groups

Paste Group	**Samples**	**%**
Group A	23	7.6
Group B	100	33.3
Group C	30	10
Group D	66	22
Group E	38	12.6
Group F	43	14.3
Total	**300**	**100**

8.2. Trace Element Analysis

The purpose of trace element analysis conducted on the El Campanario pottery sherds is to identify ceramic groups that were manufactured using similar clay sources. Trace elements can provide information on non-local ceramics, which can offer the opportunity to observe ceramic vessels produced outside of the Huarmey Valley. Trace element analysis in pottery and sediments is becoming a common method in archaeological research in the Andean region. Although, this type of analysis offers information about the sources of raw materials in the pottery production, it can also offer information about cultural interaction with other ethnic groups, cultural traditions, and ethnic identity. Trace elements are those elements found in concentrations below 100 parts per million (ppm). Trace elements do not play an important role in the geochemical reaction that formed geological deposits, and they can be concentrated or dispersed in different phases of the geochemical processes (Rapp and Gifford 1985:353). Thus, it is difficult for two pottery samples to have the same trace element concentrations unless they were derived from the same source. The difference in the concentration of trace elements can help to identify different vessel groups, which might have been produced using clay from different geological sources. Elemental analysis of pottery have been conducted in the Andean region on different cultural periods (Alcolini 2013; D'Altroy and Bishop 1990; Druc 2004; Chapdelaine *et al.* 1995, Hayashida 1999; Montoya *et al.* 2009; Sharrat *et al.* 2009, 2015; Vaughn *et al.* 2006), and have provided useful information on the chemical composition of ceramic artifacts to determine the local and non-local production of pottery vessels. The method used for these sourcing studies was instrumental neutron activation analysis (INAA) and Laser Ablation Inductively Coupled Plasma Mass Spectrometry (LA-ICP-MS). These methods of analysis require the extraction of a sample from the pottery sherd, which becomes a destructive method. On the other hand, X-ray fluorescence (XRF) is a useful technique for elemental analysis of pottery due to the fact that this instrument is capable of quantitatively measuring trace elements. The primary principle of XRF technology is that an x-ray shot at a sample creates vacancies in the atoms on the surface of the material that in turn produces secondary, or fluorescent, x-rays, which are characteristic of the elements in the material being tested (Pollard et al. 2007). The intensity of the peaks produced by the XRF is based on energy that identifies the chemical elements contained in the sample. Traditional XRF analysis can be non-destructive only for small samples that fit in the analysis chamber; however for large samples such as pottery, a small portion of the vessel must be removed for analysis (Rice 1987:394).

The compositional analysis on pottery sherds from El Campanario was conducted using a portable Bruker III-SD X-ray fluorescence spectrometer (pXRF). This a useful instrument for archaeological research because it can directly analyze the materials without having to prepare the samples and it can analyze complete and large ceramic vessels. In Peru, the pXRF has been used to conduct compositional analysis with satisfactory results (Alcolini 2013; Nikel et al. 2013; Peña 2013; Schwartz 2010). Finally, an increasing number of applications of pXRF on pottery sourcing studies has demonstrated the potential of this instrument for archaeological research (Burley and Dickinson 2010; Morgenstein and Redmount 2005; Speakman 2011; Tykot et al. 2013, Tykot 2016). While there are significant advantages in the use of pXRF in ceramics, there are also limitations in the quantity of trace elements detected by the instrument (Hunt and Speakman 2015; Tykot 2016). In archaeological ceramics low and mid-Z elements, such as copper (Cu), zinc (Zn), rubidium (Rb), strontium (Sr), yttrium (Y), zirconium (Zr), niobium (Nb), thorium (Th), and lead (Pb), can be measured with precision and accuracy under appropriate analytical conditions (Hunt and Speakman 2015:630). Incompatible trace elements such as Rb, Sr, Zr, Y and Nb are especially useful for sourcing studies (Tykot 2016:43).

The trace element analysis was conducted at the Max Uhle Museum located in the city of Casma, 375 km from Lima (Peruvian Capital). The elemental analysis of pottery from the El Campanario site was conducted on 300 pottery sherds, which included press-molded and incise decoration as well as pedestal bowls, cups, *ollas*, *tinajas*, figurines, and painted pottery. The Bruker III-SD pXRF, is a research-grade instrument that has high precision with detection limits in the single digit parts per million (ppm) ranges for many trace elements. This instrument was set to 40 kV and 11µA for 120 seconds and a filter was used to enhance the detection of certain major and trace elements. Before the analysis, each pottery samples was washed with water and cleaned with a fine brush in order to remove any materials added to the surface of the pottery sherd. The purpose of the analysis was to obtain the average chemical composition of each sample, so for this reason, the pXRF was used on a sherd spot of both the internal and external surfaces of each pottery sample. In order to obtain accurate readings from every pottery sample, X-ray exposure areas were carefully selected avoiding non-flat surfaces, painted areas, and temper inclusions visible on the surface of the pottery sherd. The results were calibrated using a set of standards analyzed by INAA, ICP-S, and XRF.

Statistical analysis used the average value for each sherd; however in cases where the values of the chemical elements are significantly different in the sample I used either the external or the internal surface data. The omission of values of either side was based on the porosity or the surface decoration of the sherd. For this research seven trace elements were measured, which include barium (Ba), thorium (Th), rubidium (Rb), strontium (Sr), yttrium (Y), zirconium (Zr) and niobium (Nb). The statistical analysis for sourcing studies was conducted using a multivariate analysis, and the SPSS 26 statistical software used enabled grouping of various sherds based on similar chemical values. Principal component analysis (PCA) is a reduction method used to reduce a large set variable into smaller data set that still contain the information of the large set. The principal component analysis was conducted using Varimax rotation with Kaiser Normalization in which seven components were identified. For the analysis only the three components were considered since they have eigenvalues above 1 (Table 8.2).

Table 8.3: Eigenvalues of the five elements used in the PCA analysis

Component	**Initial Eigenvalues**		
	Total	**% of Variance**	**Cumulative %**
1	1.688	24.111	24.111
2	1.551	22.164	46.275
3	1.195	17.078	63.353
4	0.890	12.711	76.064
5	0.609	8.703	84.767
6	0.560	8.003	92.770
7	0.506	7.230	100

The first principal component accounts for 24% of the variation, the second component accounts for 22% of the variation, and the third component accounts for 17% of the variation. These three components account for 63% of the variation in the ceramic samples. In order to observe chemical values and distribution of the 300 pottery samples, I created scatter plots using three principal components. Using the rotated component matrix (Table 8.3) I created a scatter plot of the PCA 1 and PCA 2. The first component has high score values in Rb and Zr, while the second component have high score values in Ba, Th, Rb, and the third component have high score values in Nb and Y.

The scatter plots were elaborated using three principal components and the samples were organized by paste groups in order to observe the distribution of the samples. The first scatter plot was elaborated using PCA 1 and PCA 2 (Figure 8.7). This graph shows that paste groups A, B, C, and E are relatively dispersed. In addition, group B has two samples with different trace elements values which have been categorized as outliers. In addition, paste groups D and F appear more concentrated, with the exception of one outliers in paste group F.

Table 8.4: Rotated Component Matrix

	1	2	3
Nb	0.777	0.098	-0.179
Zr	0.763	-0.073	0.257
Ba	0.17	-0.761	0.281
Th	-0.013	0.694	0.466
Rb	0.378	0.661	-0.174
Y	0.303	-0.068	0.779
Sr	0.302	0.109	-0.577

Extraction Method: Principal Component Analysis.

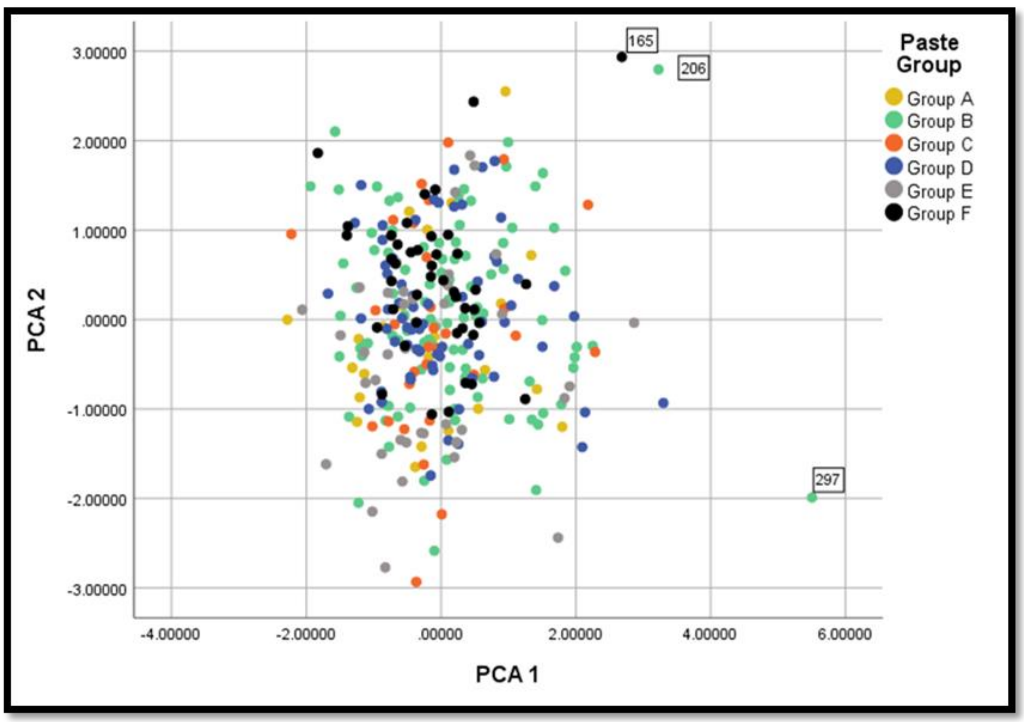

Figure 8.7: Scatter Plot using PCA1 and PCA2

The ceramic sherds classified as outliers from paste group F is the sample 165. This group is composed of blackware ceramic vessels and the typical forms include cups and pedestal bowls, which were commonly used for serving food and drinks (Figure 8.8). The sample 165 is a fragment of a blackware bottle, which was polish on the exterior surface, and it is considered a fineware vessels. This fragment was recovered in unit 16-2 on the third layer between two adobe wall which were possibly used as a corridor. The trace elements values of this fragment suggests that possibly it was obtained as part of a trade network with other cultural groups or possibly produced in a specialized area at the site or in the Huarmey Valley.

Figure 8.8: Ceramic sherds classified as outliers; a) samples 165, b) sample 206, c) sample 207

The other two outliers belong to paste group B which is the largest group from the total sample set. The first outlier is sample 206 which is a painted ceramic that has black paint over a cream paint. This fragment was found in unit 16-4 associated with domestic activities such as cooking and storing. This fragment is similar to the decoration found in Chanchay ceramics and it is possible that there was contact or cultural relations between the Huarmey Valley and the central coast of Peru. The third outlier is sample 297 which is a rim of a pedestal bowl in which the interior wall has a red slip and near the interior lip there is a white semicircular paint depicting a face with black painting. This design is different from other painted decorations found at El Campanario which mostly consisted in semicircular or straight lines. This fragment was found in unit 16-6 as part of the filling material for the construction of an adobe wall.

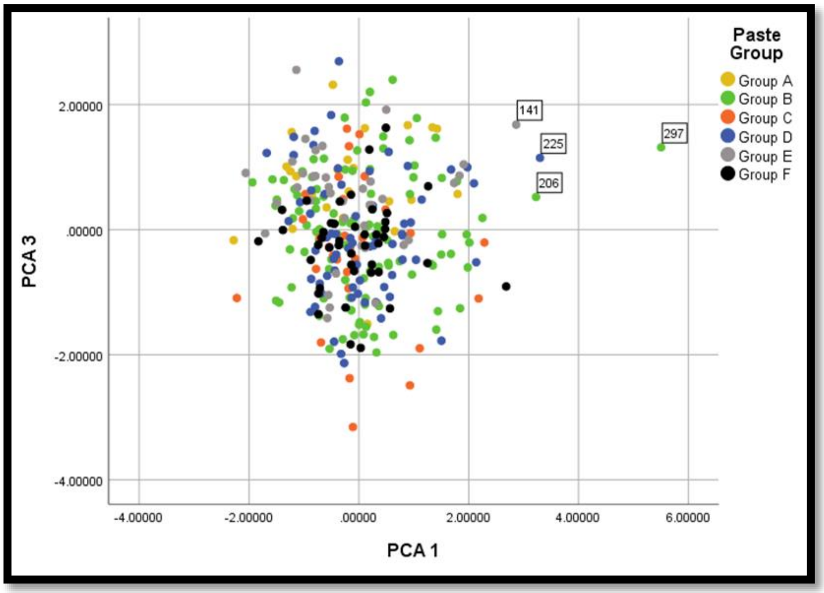

Figure 8.9: Scatter Plot using PCA1 and PCA3

The second scatter plot was created using PCA 1 and PCA 3. The first component has high score values in Nb and Zr, while the third component have high score values in Y and Sr. This second plot shows that the samples of paste group F are fairly concentrated while the other paste group samples appeared more dispersed. The outliers of paste group B (samples 206 and 297) observed in the first scatter plot also appeared as outliers in the second scatter plot which could indicate that their trace element composition varies from the other samples used in this analysis. In addition, two additional outliers can be observed in this second plot which might have different values in yttrium and strontium. One outlier is sample 141 of paste group E and the second is sample 225 of paste group D (Figure 8.9).

CHAPTER NINE:

DOMESTIC ACTIVITIES AT EL CAMPANARIO

9.1 Subsistence

The botanical remains recovered during the excavations indicate that El Campanario residents had access to various agricultural resources such as maize, beans, and peanuts among others. The presence of maize husks and tassels indicates that the entire maize plant was transported from the field to the household and processed there before cooking. Another important household activity in the Andes was *chicha* (maize beer) production, and while there is no direct evidence of this type of production at El Campanario, the presence of *tinajas* might indicate this activity. *Chicha* consumption was an important element both at public events and in private life; perhaps *chicha* production was part of a taxation system by the local elite, an exchange item between households, or produced solely to satisfy household needs. Other agricultural products found in domestic areas included various species of beans and peanuts. While these crops were found in low quantitates compared to maize, they were still an important part of the diet. In addition to agricultural products, fruits were also part of their diet, as evidence of fruit trees was found at the site, and it is possible that trees were arranged around agricultural fields in the same way that present day farmers divide their fields in the Huarmey Valley.

Marine resources were also part of the diet among residents. The presence of fishing net fragments might indicate that some members of the community directly participated in fishing activities. In addition, shellfish and crabs were also found, indicating that residents also extracted these creatures themselves. The most common shellfish species and crab fragments recovered lived in rocky habitats within the mesolitoral zone. While the sandy beach is situated in a straight line from the site, which could have made the use of fishing boats very easy, the rocky areas for shellfish and crabs, such as Tuquillo beach, are located farther away, where even today local independent fisherman extract them to earn income for their families. In addition, the presence of *cuy* (guinea pig) bone remains and coprolites suggests that guinea pigs were raised within the household for domestic consumption. Camelid bones, some of them with cut marks, were also found, indicating that residents had access to camelid meat. The consumption of camelids, especially llamas in the Andes, was commonly associated with elite groups. While the social status of household members is unclear, they had the means to include camelid meat in their diet.

9.2 Food Preparation and Consumption

9.2.1 Food Processing

Food preparation for cooking, using grinding stones and other lithic tools, was a common activity associated with households. In the Andean region, the most common elements found in domestic units were grinding stones, hearths, cooking pots (Goldstein 2005), and food storage (Vaughn 2005). Grinding stones were stationary or portable, depending upon their use. However, varieties of food sources were influenced by availability, and hard grains such as quinoa, maize or *kiwicha* were most likely processed on grinding stones (Goldstein 2005:41). Modern day households in the Jequetepeque Valley use spaces outside the house for processing maize and other plants, while small processing (and small grinding stones) occurs during the cooking process (Cutright 2009). However, excavations conducted at El Campanario did not contain remains of *batanes* (stone slab for grinding), and the only evidence of grinding stones was a *chungo* found on the surface layer at unit 16-3 (Figure 9.1). In addition, small lithic materials were recovered from most of the units (except unit 16-6).

Figure 9.1: *Chungo* recovered on unit 16-3

The processing of maize at El Campanario could be observed through remains of maize husks and tassels. Maize stalks, however, were absent in the households, possibly because initial maize processing occurred in the field or, perhaps, the stalk was used as animal feed or fuel. In the Peruvian highland, the initial processing removed the stalk and husk from maize cobs, and the stalk was used for animal feed (Sikkink 1988). In addition to maize, other plants were found, such as varieties of beans along with fruit trees, important for household subsistence but requiring little processing compared to maize. Another plant processed, although inedible, was cotton. The presence of cotton bolls and seeds suggests that cotton was transported from the field to the household in a crude stage, then the seeds extracted before the spinning process. Food storage was another element in the household, and while there is evidence of plant processing, only one unit (16-4) contained adobe structures possibly used as storerooms. However, during the excavation it was noted that these small structures did not contain evidence of organic material.

9.2.2 Cooking

Preparation of meals was indeed an important activity of households. Two cooking areas were identified at units 16-1 and 16-3 where ash deposits and organic remains were found. I define as formal cooking areas the rectangular adobe structures attached to walls. Along with these two cooking areas, a small hearth was found at unit 16-4, associated with guinea pig coprolites and small storerooms. Maize cobs were the most abundant plant remains used in household meals and maize beer preparation. During Inca times, maize was an exclusive food for the elite (Bray 2003), but excavations at the coastal site of Pacatnamu revealed that elite and commoners had equal access to maize during the Late Intermediate Period (Gumerman 1991). Other plant remains found at El Campanario consisted of several species of beans, also prepared within the households. Although the number of beans was small compared to maize cobs, this did not represent the quantity of beans harvested or consumed, since it is most likely that household members ate the beans rather than discard them.

9.3. Pottery Production

Pottery vessels played an important role in the Andean economy since they were used to prepare and serve food and drink, as well as an important role in elite-sponsored festivals. (Cook and Glowacki 2003, Bray 2003). Pottery was also important as a symbol of social identity as well as promotion of cultural ideas and rituals (Early and Jennings 2012). Evidence of Casma pottery production was found at the Casma sites of Cerro la Cruz and El Purgatorio, based on the presence of firing pits (kilns), ceramic molds, polishing stones, and wasters (Vogel 2003, 2011, 2012). Pottery production at El Purgatorio appears to have taken place within elite compounds and commoners' areas alike (Pacifico 2014; Vogel 2016).

Besides the presence of pottery production tools, both Casma sites have some ceramic fragments that show maker's marks, imprinted in order to distinguish ownership among potters when the vessels were fired in communal kilns (Donnan 1973). At the Huacas de Moche site, maker's marks appeared in domestic contexts and were possibly related to independent specialists supporting themselves by their labor in a competitive system where they needed to differentiate themselves from other potters (Bernier 2010). The absence of maker's marks might indicate the presence of a supervised, elite ceramic workshop, and, at the site of Cerro la Cruz, the absence of these marks near pottery production areas indicated that pottery was made under elite supervision (Vogel 2016).

Figure 9.2: Ceramic molds found at El Campanario

During excavations at El Campanario, a circular burned area associated with ceramic molds and polished stone was identified in unit 16-2. It is possible that every stage of pottery production, including firing, occurred within residences here. In addition, ceramic molds and polishing stones were also found in units 16-3 and 16-4; although there was no evidence of firing, perhaps residents produced pottery for local consumption. Ten molds showing typical Casma decoration of lines and dots were recovered. One mold seems to have been used to manufacture face neck jars, while another was decorated on the outside surface with dots (Figure 9.2).

9.4. Textile Production

The Inca Empire used textiles in various ways such as items of taxation, as symbols of wealth and they also were distributed as part of political favors. Expressions of social identity and social connections were also related to the distribution of textiles (Costin 1998b:123). The Inca Empire established strict laws to ensure that a person's clothing would reflect their appropriate rank, ethnicity, and place of origin. Soon after an Incan conquest, local populations were relocated to other parts of the empire and required to wear traditional clothing from their homeland and to speak their native language (D'Altroy 2002). Textile production was a common domestic activity and involved preparing the fiber, spinning of threads, preparing the warp, setting up the loom, weaving, and sewing. However, preparing the warp and setting up the loom were transitory activities which did not leave archaeological evidence (Moore 1985:284).

Textile analysis conducted at the Casma sites suggests that production occurred in domestic settings. At the site of Cerro la Cruz, cotton textiles were most likely produced locally and *pacae* seeds were probably used as dyes. In addition, weave patterns found at Cerro la Cruz, two warp strands crossed with one weft strand in every pass (2x1), are typical for Late Intermediate Period textiles (Vogel 2012:130). At the site of El Purgatorio, the commoners' area (Sector B) also contained evidence of textile production, including spindle whorls and cotton seeds. Production at sector B was intended for domestic use (Pacifico 2014). There is no doubt that production occurred at the El Purgatorio site; however, it is still unclear if it was controlled or sponsored by the elite. Low quantities of spindle whorls at sector B compared to sector A and C might indicate that the elite or intermediate elite engaged in textile production more often than commoners; commoners may have been more focused on *chicha* production and food preparation (Vogel 2017).

Production at El Campanario was identified based on the presence of cotton bolls and seeds, spindle whorls, and wooden sticks found in the residential areas. Large concentrations of cotton bolls were found in units 16-3 and 16-5, which could have been areas used to process or store cotton. During post-excavation work, eighty-four textile fragments were analyzed in which 66 were manufactured entirely of cotton, ten of wool and eight of a cotton/wool blend (Figure 9.3). Production of wool textiles occurred predominantly in the highlands, and while coastal societies also produced wool textiles, they had a preference for cotton-based textiles (Moore 1985) and manufacture of cotton/wool blends was common on the coast (Rowe 1980). Domestic manufacture used brown and white cotton, some fragments showing a straight blue line as part of the decoration. This blue or indigo pigment was obtained from the *pacae* seed (Vogel 2012), also found within homes and likely produced onsite.

At the site of El Castillo de Huarmey, Heiko Prümers (2000) studied 366 textiles recovered during excavation (1985/1986) and 155 textiles from the Ubbelohde-Doering collection. In this study, Prümers concluded that 92% of the textiles were of the Moche-Wari style, 7% of the Wari style, and the remaining textiles of the Nazca 9 and Sican Medio style. The Moche-Wari textiles consisted of decorated and plain textiles in which the latest were mostly manufactured with cotton double warp and single weft. While this technique was commonly associated with the Chimu culture, Prümers argued that there was not a specific technique used exclusively for one culture in the manufacture of textiles, instead these cultural traditions were shared for different cultures and in some cases they spread across different regions. The Moche-Wari style, according to Prümers (2000:300), was a local variation that developed along with other styles that shared ideas, materials and a preference for certain iconographic elements.

Figure 9.3: Textiles fragments found at El Campanario

9.5. *Chicha* Production

Alcoholic beverages played an essential role in the reciprocity system, a key tradition within the Andean economy (Allen 2002, 2009). C*hicha* was used as currency for socio-political exchange; however, the elite did not have a monopoly over *chicha* production, and the most common method of labor exchange between households involved its distribution (Parker and McCool 2015). Jerry Moore (1989) used ethnographic and ethnohistorical information to analyze archaeological data at the Manchan site in order to identify maize beer production at this site. Materials that correlated to *chicha* production included maize ears and cobs, large jars for soaking the kernels, patio areas where the maize was allowed to germinate, hearths, cloths used to cover the germinating kernels, *alfrecho* (small fragment of malted kernels), a milling stone or *batan*, and gourds (Moore 1989: 686-687). In addition, *alfrecho* remains could be studied to estimate the quantity of maize used in the preparation of *chicha* and the amount of maize beer produced. Based on this analysis, Moore suggested that *chicha* production was oriented towards satisfying the needs outside the households (Moore 1989). Archaeological evidence of *chicha* production at Manchan suggests that households produced *chicha* for external demands without directly involving the Chimú state, since no specialized social contexts have been found in the *barrio* structures and methods and tools used in the production of *chicha* were widely distributed among the households at Manchan (Moore 1989:692).

Research on *chicha* production also suggests that this activity occurred in specialized locations under the sponsorship of elite or a centralized state (Valdez 2006). However, it appears that *chicha* production was a household activity and, depending on need, multiple households were involved in order to satisfy community needs (Goldstein and Coleman 2004). Frances Hayashida (2008) conducted an ethnoarchaeological study on *chicha* production on the northern coast of Peru to identify processes, materials associated with *chicha* production, raw materials, labor, and variations in techniques and organization that served as a point of comparison with the archaeological record. In this study, Hayashida provided information that can be used to identify two different types of organizations in *chicha* production in the Andes. The first one being large-scale production that included permanent facilities, and the second being small-scale household production. Household production of *chicha* might be harder to identify based on current archaeological records; however, data compiled from modern household production illustrates that large vessels were used for cooking, cooling and fermenting, and that these vessels were relatively larger than other vessels since weekly supplies of maize beer were prepared at one time, and daily consumption of *chicha* surpassed the consumption of cooked foods (Hayashida 2008:172).

Ethnographic research conducted in the Cuzco region established 15 indicators present in *chicha* production at the household level. The results of this study aided in the identification of *chicha* production remains in an archaeological context. The study's 15 indices have established a criteria for identifying fermentation vessels, grinding vessels, wooden tools, and a number of hearths (Table 9.1). Parker and McCool point out that these indices cannot prove the existence of brewers or brewing in the archaeological record, but the identification of one of more indices can provide an initial identification of *chicha* production within the household (Parker and McCool 2015:387).

Table 9.1: Summary of the 15 indices of *chicha* production (*adapted from Parker and McCool 2015*)

Indices	Description
1	Vessel from and uniformity
2	lack of sooting on fermentation vessels
3	Lack of pedestalled temper on interior surface of fermentation vessels
4	Rim attrition on fermentation vessels
5	Lack of scratching on internal surfaces on fermentation vessels
6	Lack of abrasion on exterior surfaces on fermentation vessels
7	Spike in ubiquity of very large jars in household assemblages
8	Spike in ubiquity of large cups in household assemblages
9	Presence of specialized tools in household assemblages
10	Presence of rocker-style gridding stones
11	Support holes in kitchen floors
12	Presence of second (boiling) hearth
13	Increased sooting on walls and in vent holes
14	Presence of maize isotopes
15	Drip lines on fermentation vessels

The production of *chicha* has been reported at Casma sites such as Cerro la Cruz (Chao Valley) where maize, large ceramic vessels and drinking vessels (kero) were found, and it is likely that *chicha* was used at feastings (Vogel 2003). In addition, excavations at sector B of El Purgatorio (Casma capital) indicate that households were producing *chicha*, although there were difference in the intensity of the production based on the size of *batanes*, the amount of storage space and the number of large ceramic vessels. Production and later, consumption of *chicha* could have been oriented to satisfying community needs as well as an exchange item with other sectors at El Purgatorio (Pacifico 2014). *Chicha* consumption during feastings was commonly associated with *kero* cups used for tasting and drinking (Moseley et al 2005). However, other pottery types such as faceneck jars, bowls (Pacifico 2014), and gourds (mates), were also used for *chicha* consumption (Swenson 2006). Today, in modern Peru, gourds are still used for drinking *chicha* as part of the daily meals.

There is no direct evidence of *chicha* production, such as the *alfrecho*, wooden tools or various sizes of grinding stones at El Campanario households. However, the quantity of maize recovered from each unit, as well as the presence of large jars for brewing, potentially indicates that *chicha* production occurred at the household level. Based on current findings, it is difficult to estimate the intensity of *chicha* production and distribution at El Campanario. At the El Purgatorio site, *chicha* was part of a redistribution system controlled by the elite (Pacifico 2014), but it is unclear if El Campanario households provided *chicha* to the local elite or it was produced solely to satisfy household or community needs. In addition, various types of pottery vessels and gourd (mate) fragments associated with *chicha* consumption have been recovered from El Campanario households and indicate that household members consumed *chicha*.

9.6. Ritual Activities

9.6.1 Camelid Offerings

South American camelids were an important part of household consumption as well as markers of social status (Gumerman IV 1991). Camelids (complete bodies or some parts) were also used as offerings in burial for most prehispanic societies (Goepfert 2002). Other type of offering not associated to burials was also reported in some ceremonial sites such as the Moche site of Sipan (Goepfert 2010). This offering includes large quantities of camelid bones along with ceramic, copper artifacts lithic objects, and *spondylus* shells. This offering was not of domestic nature and it is most likely that was the remains of an important feasting event occurred after the lord of Sipan was buried (Goepfert 2010:37-38). Furthermore, camelid bones also appeared in small group in fill areas in the construction of monumental structures (Rick 2017). The excavations at El Campanario have provided limited number of camelid bones which indicate that residents have access to camelid meat but not in large quantities and it is possible that they were consume during special extrahousehold events. However, there are two contexts in which camelid bones discarded in different ways. In unit 16-8 there was a camelid ulna partially burned and buried under the tamped floor in a small pit. The excavation of this floor did not reveal the presence of other camelid bones or large quantities of food remains that would have suggested it was used as a waste deposit. In this unit other burning events were reported but without any camelid bones or any other material associated. The other camelid offering was found in unit 16-7 and consisted of a single individual (the skull was absent) which was accommodated like a bundle. After the camelid was deposited and buried there was a burning on the sandy layer. Unit 16-7 is the only unit that does not have architecture and it is situated south of unit 16-8 and west of unit 16-6 and it is possible that this offering was associated to either of those units.

9.6.2 Hair Offerings

Household activities at El Campanario were not oriented solely to production and consumption but also to ritual activity. The most common type of ritual behavior identified was hair offerings. These hair offerings consisted of tying locks of hair together (Figure 9.4). Hair bundles and their association with household rituals have been found at other coastal sites as well, such as Pedregal (Cutright 2009:263), Cerro la Cruz (Vogel 2003:325, 2012:137), and El Purgatorio (Pacifico 2014:149). They were possibly associated with construction events, life-cycle rituals, and sympathetic magic (Cutright 2009; Vogel 2003). In the Andes, body materials had to be discarded very carefully, because if they fell into the wrong hands, they could be used in magic (Vogel 2012). These hair bundles could have been also used for contagious magic or sorcery in which personal items are obtained in order to inflect some harm. On the other hand, these hair bundles could have been used as offerings for an expected outcome (Vogel 2012, 2016). In addition, two textiles bundles were found at El Campanario, also used for ritual purposes. Another offering related to human hair was located in unit 16-3 under the floor and consisted of two gourds: one used as a container for human hair on top of seven pieces of rocks, and the other used to cover the human hair. Next to the two gourds was a blackware ceramic cup placed as part of the offering. It is unclear whether the cup at one time contained maize beer.

Figure 9.4: Hair bundles and hair offering in an ancient gourd bowl found at El Campanario

9.7 Household Refuse

The excavation at El Campanario also provided information on the disposal of garbage within the households. While artifacts and food remains were found in different layers in the units, concentrations of waste deposits were found inside some units. These deposits appeared next to walls and near the entrances to household spaces. The waste deposit at unit 16-5 was prepared by digging about 20 cm into the tamped floor to deposit fish bones, maize cobs, pottery sherds and broken stone tools (Figure 9.5). Other waste deposits were also excavated on the northern side of the large adobe wall in unit 16-3. One of these was semicircular of about 60 cm in diameter and 50 cm deep and contained mostly maize cobs, pacae seeds, guanabana and cherimoya seeds, animal bones (especially camelids), as well as a fragment of a fishing net. The second waste deposit was partially excavated, was 40 cm deep and also contained organic remains. Both waste deposits were located near the adobe wall and within an area that was assumed to be a patio where the sharing of food and drink had probably occurred.

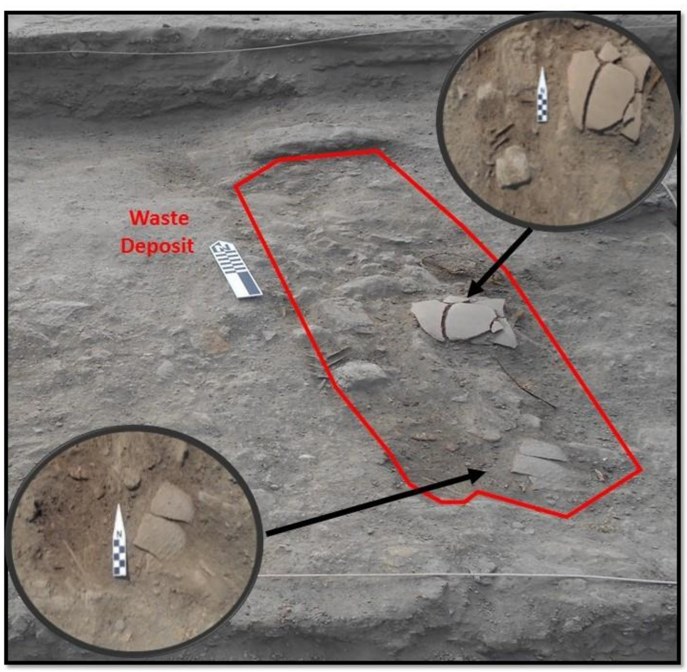

Figure 9.5: Evidence of refuse in unit 16-5

CHAPTER TEN:

DOMESTIC LIFE AT EL CAMPANARIO

10.1 Household Activities at El Campanario

The excavations within the domestic contexts at El Campanario has provided insight into the activities conducted in these areas (Figure 10.1). The most common activity in the household was food preparation. Equipment related to this important activity consisted of grinding stones used to prepare food for cooking. While there was no evidence of *batanes* at El Campanario, other gridding stones such as the *chungo* and various pestles sizes were found. Robin Cutright (2009) observed that *batanes* are used near cooking areas in modern day households in the Jequetepeque Valley. Robin Goldstein (2008) suggests that food processing using grinding stones required time and labor, and larger households had larger labor pools, often including children, and it is possible that smaller households depended on the labor provided by those larger households. Furthermore, houses with multiple generations had more labor available, making those households more productive. The model proposed by Goldstein shows a flexible arrangement of domestic production and consumption that involved different house structures. While cooking areas were identified at El Campanario, there was no evidence of *batanes*. These gridding stones were common elements within households and could be used to identify domestic activities; however, *batanes* could be removed and taken by household members, especially in an area where these slabs were hard to find. The procurement of food was also an activity conducted by household members. The varied agricultural products found at the site demonstrated household access to various plant species and it is most likely that men and women alike participated in this activity. Ethnoarchaeological research shows that in Andes communities, the farming routine was very demanding, men and women may have performed overlapping tasks, and the division of labor by gender was not fixed (Sikkink 2001:108). The most abundant species found in every unit at El Campanario was maize, indicating that it was the major crop in the valley. Harvesting maize involved cutting the plant, letting it dry in the field and later transporting it to the household where kernels were removed from the dry cobs, or whole cobs were stored in their husks (Sikkink 2001:109). While storage areas were not identified during excavation, maize husks were found in most units. This suggests that maize was stored within the household. Other agricultural products found in the household included various species of beans and peanuts. While they were found in low quantities compared to maize, these crops were an important part of the diet. In addition to agricultural products, there were fruit trees, the yield of which was also part of their diet. It is possible that trees were arranged around the agricultural fields in the same way that present day farmers divide their fields in the Huarmey Valley.

Besides agricultural products, marine resources were an important part the household diet. The shoreline was very close to the site and the presence of fishing nets within the household demonstrated that household members at El Campanario were in charge of fishing and shellfish collection. Today in Huarmey, shellfish extraction is a male activity and, in most cases, conducted on a part-time basis. During my visits to Huarmey Port and nearby beaches while I was conducting fieldwork activities (June to August) I observed individuals with their baskets walking towards the rocky areas on the shoreline most commonly in the late afternoon. Marine species recovered during excavation indicated that the areas of shellfish extraction were mostly in the rocky habitats located on the shoreline, and required specialized skills. In the case of terrestrial animals, the most common mammal found in household remains was the guinea pig, raised within the houses. Camelid bones, on the other hand, appeared in low quantities, which could indicate that camelid was a restricted food source for the household, or perhaps used for their hair for weaving as well as for transportation.

Figure 10.1: Activities areas at El Campanario

The preparation of *chicha* (maize beer) was another important household activity in the Andes. At El Campanario there was no direct evidence of *chicha* production; however, the presence of large quantities of maize and the large *tinajas* might indicate that this activity was conducted in households. *Chicha* preparation today on the north coast of Peru appears to be a women's household activity (Hayashida 2008). During Inca rule, *chicha* was prepared by the *aqllas*, or chosen women, as part of their tribute to the state (Morris 1975). In the domestic structures at sector B of the site of El Purgatorio, *chicha* was produced not only for internal household consumption but also as a form of tribute to the elite (Pacifico 2014). While there is the possibility that *chicha* production was conducted in the households, it is unclear if the *chicha* was also used to satisfy the need of the local elite.

Food consumption also occurred within the household. The amount of food remains and areas of food refuse indicated that most of the food obtained from the field, shoreline and domesticated animals served for household consumption. The presence of ceramic serving vessels with various decoration patterns, along with blackware serving pots, suggested that consumption activities might had occurred outside the household unit. While there is limited evidence for extra-household feasting, the use of decorated ceramics and especially blackware vessels could indicate that they were used at public events where food and drink were consumed. In addition, *chicha* consumption was an important element in public events and private life. Cups and bowls, commonly associated with *chicha* consumption, constituted a significant number of the pottery recovered at El Campanario.

Textile production was also an important activity at El Campanario, and it is most likely that all stages were conducted in the household. Recovered cotton bolls suggested that cotton was transported from the field to the household by residents. In addition, cotton seeds and fluff were found in most units, indicating that initial cleaning and processing also took place within the household. Evidence of spinning activities are based on the presence of spindle fragments containing camelid fiber and cotton threads along with *torteros*, manufactured with ceramic fragments. Besides cotton, households also used camelid hair; it is possible that camelids, particularly llamas, were raised on the north coast of Peru, although it is unclear if the llamas were under the supervision of the elite or the community. Cotton textile fragments found at the site were significantly larger than camelid fiber or cotton-fiber combinations. Cotton textiles are part of the long coastal cultural tradition through generations that continue using it as raw material as well as the "S" torsion technique during the spinning. However, the presence of camelid fibers, the "Z" torsion and tapestry techniques suggest the influence of cultural knowledge from the highland which developed during the Middle Horizon. While there is clear evidence of processing and spinning activities, as well as final production, back-strap looms were not found at the site. During the survey of the nearby pre-hispanic cemetery which had been looted, possibly contemporary to El Campanario, spindle whorls and a beater tool from a back-strap loom were found on the surface. Possibly, residents were buried with their looms and other objects used in textile production or, when they abandoned the site, they took their looms with them.

The household activities observed here show that El Campanario residents engaged in tasks to satisfy domestic needs. It is clear that they did not establish exchange relations with nearby groups, such as farmers or fishermen, and that household members were independently obtaining food sources from accessible areas. On the other hand, it is also possible that long distance exchange occurred at the site, especially with camelid fiber textiles, traditionally manufactured in the highland. However, the role of local elite in the organization of craft production and in the exchange networks remains unclear. Monumental architecture at the site suggests the presence of political authority that most likely depended on household production of resources it needed through taxation. Textile production was an important aspect of the Andean economy, and possibly textiles were produced not only to satisfy household needs, but also for the local elite. There is no evidence of a textile workshop at the site, but the manufacture of textiles was conducted at the household level. In addition, the presence of cotton bolls, camelid fluff, and *torteros* made of ceramic fragments, along with wooden shafts, could indicate that local elite were not directly involved in textile production. Another valuable item produced in the household was maize beer (*chicha*), consumed at public events such as feasting, so as to reinforce social ties. However, botanical and ceramic evidence suggested that maize beer production was more oriented to household consumption, inter-household exchange as well as small-scale feasting among households.

10.2 Pottery Production at El Campanario

The manufacture of ceramic vessels was another activity conducted in households at El Campanario. Ceramic molds containing dot and line decoration were found in almost every unit, along with polishing stones. In addition, during the excavation of unit 16-2, a small semi-circular structure containing evidence of intensive fire was recognized as a kiln. Although this was the only kiln found at the site, it is too small to be part of a specialized workshop. Based on the analysis of ceramic, the press-molded decoration is the most common type found at the site and occurred independently in each household.

Paste analysis conducted on the pottery sherds demonstrated the various types of temper used in the manufacture of pottery obtained from different areas within the Huarmey Valley. While a geological survey was not conducted as part of this dissertation, geological information of the Huarmey Valley was obtained through the INGEMET report of 2017 which aimed to assess the impact of the El Niño phenomenon in the valley. The types of temper on pottery sherds consisted of sedimentary rocks found in the vicinity of the site on both sides of the Huarmey River. However, volcanic rocks were also found in the middle area of the valley and up to 15 kilometers from El Campanario. In the study of local procurement of raw materials (clay and temper) for the production of pottery, Isabelle Druc (2013) suggested a range of three to nine kilometers in the acquisition of raw materials on foot; the use of animal transport may have widened the area of extraction. In the Andes, areas where materials were obtained may have been determined by sociopolitical factors, cultural traditions, or personal preferences (Druc 2013:502-503). While procurement of raw materials commonly occurred in the vicinity of the site, kinship relations might have influenced selection, for example, potters may have collected materials while visiting relatives living in distant locations (Sillar 2000:69).

Paste analysis conducted on pottery sherds at El Campanario shows high variability in paste composition, suggesting that potters obtained raw materials from various sources throughout the Huarmey Valley. The manufacture of press-molded ceramics, polychrome and incise decoration displayed most of the variations in temper composition. The manufacture of polychrome pottery, which continued after the Middle Horizon, was performed using the same paste composition as in the manufacture of Casma style pottery. Continuity in the manufacture of polychrome pottery could indicate the importance of the Huarmey Valley during the Middle Horizon which allowed the local population to maintain certain aspects of Wari ideology. While the presence of foreign styles is clear at El Campanario, pottery manufacture followed local Casma traditions. Paste analysis also showed little variation in temper composition in blackware pottery sherds commonly associated with cups, pedestal bowls, bowls, and jars. Production of these types of ceramic vessels required a different selection of raw materials, specifically in temper composition. The presence of volcanic rock and micas were more frequent in blackware vessels.

Compositional analysis was also conducted on pottery sherds and shows similarities in elemental composition of the clay in almost all of the pottery analyzed. The portable X-ray fluorescence spectrometry provides information related to the difference between local and imported pottery, but cannot distinguish between clay sources within the same valley (Sharratt et al. 2015). It is possible that various clay sources were used in the manufacture of redware and blackware pottery alike. The selection of clay could have been related to the proximity to areas where temper could be extracted, or related to other activities such as farming. In the Taraco Peninsula, procurement of clay for Late Formative farmers occurred as part of their daily activities, especially during wet, rainy seasons (Roddick 2013:297). Compositional analysis also showed three outliers with different elemental composition. It is unclear if these fragments are from imported pottery or were produced from clay sources outside the Huarmey Valley. The Culebras Valley is not far from El Campanario, and can be reached on foot in less than a day. While the clay of these fragments has a different trace element concentration, the temper used in their manufacture is similar to other pottery sherds analyzed.

Ceramic analysis conducted on pottery sherds from household contexts suggested local production of ceramic vessels as well as potters' choices of raw materials. The various activities observed in the household allowed members engaged in pottery manufacture to acquire raw materials needed while performing other tasks.

CHAPTER ELEVEN:

CONCLUSIONS

11.1 Household and Daily Practices

The research conducted at El Campanario was oriented to the study of the domestic areas situated on the east side of the archaeological site. I selected this area (Sector C) for archaeological excavation because food remains and pottery sherds of large ceramic vessels were found on surface, which indicated the presence of domestic areas. In addition, Sector C has little activity of local looters and is located approximately 60 meters from the modern cemetery and refuse areas. While El Campanario has been known by archaeologists since the 1950s, there was very little research conducted at the site and the only comprehensive work at the site was conducted by Enrique Zavaleta and Rocio Sanchez (2011). In their work, Zavaleta and Sanchez proposed a division of five sectors with distinctive architecture and functions; however, this work was based on ceramics and other materials collected from the surface.

In order to study the domestic areas at El Campanario, I used the theoretical approaches of household archaeology. The archaeological definition of households states that production and consumption are the primary aspects of the household in a society (Ashmore and Wilk 1988; Hirth 2009). Research conducted at the site of El Campanario has permitted the observation of various types of activities performed within the household such as food production and consumption as well as the manufacture of textiles and pottery. Furthermore, signatures of food production at El

Campanario include food processing and cooking areas. While production of craft goods is an important household activity, especially in the study of specialization, Hirth suggests that domestic craft production should be studied as an integral part of the household economy (Hirth 2009).

These series of tasks conducted within living spaces were not performed in isolation; instead, household members participated collectively to transform resources to satisfy their needs. As Tim Ingold (1993) suggests, every activity or task (taskscape) had its own importance and status within the larger group of tasks, and was conducted in series or parallel to many other individuals working in the same space. The performance of daily tasks within the household also allowed people to contextualize their landscape. The knowledge of the Huarmey Valley landscape provided residents at El Campanario access to resources as they moved throughout the valley. The organization of task schedules among household members allowed them to obtain resources not solely for household subsistence but also for the manufacture of craft goods. In addition, skilled household members were in charge of specialized activities such as pottery production, but this did not exclude them from other daily tasks. Settlements use their landscape for multiple purposes, such as natural defense areas, ancestor veneration and distribution of various household activities (Wynveldt et al. 2016). Potters at El Campanario site most likely collected raw materials, such as temper and clay, on their way to the shoreline to obtain fish or marine mammals, while collecting shellfish or farming the land. In addition, some tempers were possibly obtained from areas in the middle Huarmey valley through social or kin-based relations with other communities there. As Bill Sillar (2000) points out, procurement of resources in the manufacture of pottery usually occurred in the vicinity of the site; however, potters might have collected raw materials while visiting relatives living in distant locations.

Ceramic analysis showed variations in raw materials used in the manufacture of pottery and decoration, specifically painting, reflecting different knowledge and skill levels of paste recipes, firing techniques, and the use of paint in decoration in pottery production. Another craft activity was the manufacture of textiles of cotton and camelid fiber. Evidence at El Campanario suggests that all stages of textile production occurred in the household, from the extraction of cotton bolls in the fields to the final product. Household members participated in harvesting the cotton and carrying it to the household for cleaning and spinning. Besides cotton bolls, remains of camelid fibers were also recovered, and it is possible that household member had direct access in order to produce textiles entirely of camelid fiber or in a blend with cotton. While spinning activities have been identified at the site, there was no evidence of looms or other artifacts associated with the manufacture of the textiles. It is possible that household members took their looms with them at the time of abandonment or were buried with them in the nearby cemetery northwest of the site.

Household activities may have been organized based on gender and age. Ethnoarchaeological studies in the Andes show that pottery production was conducted by males, who were in charge of all stages, from procurement of raw material to the final firing of the vessels. In addition, farming, fishing and shellfish collection were also associated with men, and through the process of securing subsistence for the household, they also obtained raw material for pottery manufacture. It is also possible that men were in charge of gathering cotton bolls from the field and transporting them to the household. On the other hand, textile production and domestic activities, such as food processing, cooking and preparing *chicha* (maize beer), could have been performed by women. The manufacture of textiles on the coast of Peru is commonly associated with women, although there are some cases where men also participate. On the northern coast, women are usually in charge of food processing and cooking. In addition, preparation of *chicha* on the northern coast of Peru even today is conducted by women as part of their household activities. Organization of these household activities based on age is difficult to determine in archaeological records; however, it is most likely that children were part of the household structure and the artifacts that may have been toys might indicate the presence of infants. In some areas of the Andes, children participated in various activities both within as well as outside the household, such as accompanying and helping adults during harvesting or fishing, in addition to helping with cooking and attending to small domesticated animals.

Research at El Campanario has provided the opportunity to observe the organization in household production through an understanding of the landscape and resources available in various areas of the valley. This knowledge allowed household members to obtain various resources to satisfy immediate needs.

11.2 Pottery Production and Identity

Research on household craft production, specifically pottery, suggests that it was oriented mainly to satisfying household needs. While it is most likely that ceramic vessels produced in the household were used by the local elite, there is no evidence of specialized workshops or intensification that might indicate direct elite control over the ceramic production. Furthermore, the Casma Polity has been interpreted as a state level society with a hierarchical political and social system with forms of taxation. However, data from domestic contexts at the site suggests that labor organization at the household level was not oriented to satisfying the needs of elite in the large city of El Purgatorio in the Casma Valley.

The organization of pottery production at El Campanario was embedded within others domestic activities and cannot be classified as attached or independent production. This intermediate or embedded form of production places an emphasis on the social nature of production in which households does not produce craft goods exclusively for the elite. It was also found in other archaeological sites in the Andean region (Bernier 2010; Janusek 1999; Uceda 2010). In addition, pottery paste analysis shows the variation in paste composition in the manufacture of pottery indicates the choices of raw materials made by potters at El Campanario. The geological information of the Huarmey Valley outlined in this dissertation allowed speculation about the possible sources taken advantage of in the procurement of temper for the manufacture of pottery. The selection of geological areas can be interpreted as varying technological traditions which were learned within the household or community. The sharing of knowledge and experiences occurred within the social group and then transmitted through generations. Learning occurs as part of social interaction and the communities, rather than individuals, are the source of learning (Sassaman and Rudolphi 2001). While, the paste analysis conducted at the site indicated six different paste groups, these do not indicate the presence of six communities of practice, The study of clay and temper selection, which occurred at the beginning of the pottery manufacture process as well as the identification of procurement zones can help to identify social networks of potters (Eckerd el al. 2015:8).

Communities of practice place an emphasis on the learning process in pottery manufacture, but this learning also occurred within the community of identity in which potter social networks shared a group identity (Eckerd el al. 2015; Eckert 2012). Crafting is one of many ways in which people maintain and reproduce social identity and relations, and the process of crafting depends on the people’s experiences and how social relations are situated in a specific historical and cultural context (Sassaman and Rudolphi 2001). The ceramics recovered at El Campanario consisted mostly of press-molded and incised wares. While these two types are commonly linked to the Casma Polity, some decorations are particular to El Campanario, such as marine birds and molded seashell applications on pottery walls. In addition, painted pottery was also found within domestic contexts, and some of them contain press-molded decoration. The presence of painted ceramic, along with press-molded and incise decoration, was the result of a process of integration from which the community at El Campanario developed a new social identity.

11.3 Ethnic Boundaries and Cultural Contact

The Huarmey Valley is considered the southern border of the Casma territory based mostly on results of surface collection conducted in the valley and the presence of archeological sites containing press-molded and incised pottery decoration. The radiocarbon dates obtained from the archaeological excavation at the El Campanario site put the occupation of the domestic areas during the Late Intermediate Period. This cultural period marked the decline of the Wari influence in the Huarmey Valley.

The excavations in domestic areas at El Campanario allowed us to recovered press-molded and incise pottery decoration. However, construction techniques used in domestic areas do not follow Casma traditions reported in the Casma Valley. In addition, layout and construction techniques of the monumental architecture at El Campanario differ from the site of El Purgatorio. While El Campanario household residents manufactured ceramics using press-molded and incising techniques, the geographical distance from the Casma Valley could have allowed household members to access various cultural expressions in their search for their own ethnic identity. The painted ceramic decoration resembled ceramic styles from the central coast of Peru and textiles manufacture possibly in the highlands indicate the access of El Campanario residents to other cultural traits.

The Huarmey Valley appeared to be an area of cultural interaction following the onset of the Wari presence in the Valley. It is most likely that exchange networks during the Middle Horizon continued during the Late Intermediate Period. Interaction among ethnic groups is important to define boundaries of members and non-members of those groups, but boundaries can also act as places where social networks allow interaction between social and ethnic groups, producing innovation and change as well as manipulation of group identities (Mullins 2011). Richard Reycraft (2005) argues that ethnicity is the mechanism by which groups of individuals sharing a common identity use culture as a symbol of internal solidarity in opposition to other social groups. Access to distinct cultural traits allowed El Campanario inhabitants to develop their own symbolic material culture which was used as a cohesive mechanism of group solidarity.

According to Bryan Feuer (2016), the movement or diffusion of things, ideas, and practices occurred as a result of migration or colonization as well as through intermarriage practices. While there is no information about patterns of migrations at El Campanario, the presence of various technological choices in the manufacture of pottery might indicate the transmission of cultural knowledge from different ethnic groups. These technological choices were not limited to temper selection, but also to the finishing process of pottery production. Variations in the surface treatment, and the use of paintings and the complexity of designs suggest that technological knowledge was shared with other social groups. In addition, some fragments of tapestries were found within the domestic areas, and while textiles produced exclusively using camelid fiber are common in the highland, it is possible that tapestries were produced at El Campanario by individuals or groups who migrated from the highland to the coast.

11.3 Future Research

The research conducted at El Campanario has provide information on household organization in the Huarmey Valley during the Late Intermediate Period. However, excavation was limited to domestic structures, and other areas remain untouched. The goal of future research is to continue excavation of the monumental architecture as well as of domestic structures in other areas of the site. We now have information about household organization, but it is also important to know the role of the local elite.

Ceramic paste analysis was based on geological information related to the impact of the El Niño phenomenon in Huarmey, and while this is a valuable source for research, a more detailed survey is needed in order to identify clay sources and the provenience of various types of temper within the valley. In addition, chemical analysis of factors such as stable isotopes in camelid fiber will determine if the fiber used in the manufacture of textile came from locally raised camelids or as part of exchange with the highlands. Furthermore, other Casma sites within the valley are well preserved and can provide more information about the Casma occupation in the Huarmey Valley and their interaction with other cultural groups of the Andean area.

Finally, during excavation, the mayor, as well as local residents from Huarmey, were invited to visit the site. Future research will aim to share findings with the local population and their schools in order to increase knowledge of their cultural heritage and the importance of past societies in the development of their cultural identity.

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APPENDIX A

MATERIAL CATALOG

Ceramics

Table A1: Vessels types unit 15-1

Vessel Types	**South**			**North**		**TOTAL**
	layer 1	**layer 2**	**layer 3**	**layer 1**	**layer 2**	
Pedestal Bowl						
Redware						
Rim	15	1			3	19
Base	14	2				16
Blackware						
Rim	14		1	1	11	27
Base	21	1	1		5	28
Press-Mold Base						
Redware						
Blackware	1					1
Painted Rim						
Interior						
Exterior						
Bowls						
Redware					2	2
Blackware	1				3	4
Painted						
Cups						
Redware						
Rim					3	3
Base	2				1	3
Blackware						
Rim	2					2
Base	7					7
Decorated base						
Redware						
Blackware						
Parallell lines (Blackware)						

Table A1 (*continued*)

Vessel Types	**South**			**North**		**TOTAL**
	layer 1	**layer 2**	**layer 3**	**layer 1**	**layer 2**	
Jar						
Redware	19	2	3	1	21	46
Incise/Molded Decoration	2					2
Blackware						
Incise Decoration						
Olla						
Redware						
Blackware						
Cambered					1	1
Neckless	1	1				2
Incise-Tistle handle						
Tinaja						
Redware	5	2		3	10	20
Blackware						
Handles						
Redware	1					1
Blackware	8		1			9
Painted						
Incise						
Twisted						
Ceramic Mold	1					1
Tortero						

Table A2: Pottery decoration unit 15-1

Pottery Decoration	**South**			**North**		**TOTAL**
	level 1	**level 2**	**level 3**	**level 1**	**level 2**	
Press-Molded						
Dots and Lines	23		4		5	32
Dots	1			2	2	5
Lines	3		2			5
Geomethic Desings	1				1	2
Zoomorphic Desings					2	2
Parallell lines						
Incise						
Circles			3		3	6
Lines						
Circle and dot						
Geometric Desings						

Table A2 (*continued*)

Pottery Decoration	**South**			**North**		**TOTAL**
	level 1	**level 2**	**level 3**	**level 1**	**level 2**	
Serpentine Applique	2	1		1		4
Painted	2	3	3	2	1	11
Figurine						

Table A3: Ceramic vessel types of unit 16-1

Vessel Types	**Layer 1**	**Layer 2**	**Layer 3**	**Layer 4**	**Layer 5**	**TOTAL**
Pedestal Bowl						
Redware						
Rim	17	7	3			27
Base	3	7				10
Blackware						
Rim	15	14	3			32
Base	7	4	2			13
Press-Mold Base						
Redware	2	1				3
Blackware	1					1
Painted Rim						
Interior	1					1
Exterior						
Bowls						
Redware	1					1
Blackware	2	3				5
Painted						
Cups						
Redware						
Rim	7	6	3			16
Base	2	4	1	1		8
Blackware						
Rim	7	6	3			16
Base	8	6	6			20
Decorated base						
Redware						
Blackware	2		1			3
Parallell lines (Blackware)						

Table A3 (*continued*)

Vessel Types	**Layer 1**	**Layer 2**	**Layer 3**	**Layer 4**	**Layer 5**	**TOTAL**
Jar						
Redware	11	2	2		1	16
Incise Decoration	4	2				6
Blackware		4				4
Incise Decoration						
Olla						
Redware	12	3	4	1	2	22
Blackware						
Cambered						
Neckless						
Incise-Tistle handle						
Tinaja						
Redware	13	3	5	1	2	24
Blackware						
Handles						
Redware	9	8	2			19
Blackware		2				2
Painted						
Incise						
Twisted						
Ceramic Mold						
Tortero						

Table A4: Ceramic decoration of unit 16-1

Pottery Decoration	**Layer 1**	**Layer 2**	**Layer 3**	**Layer 4**	**Layer 5**	**TOTAL**
Press-Molded						
Dots and Lines	19	7				26
Dots	3	1	1	5		10
Lines	14	15				29
Geomethic Desings	1					1
Zoomorphic Desings						
Incise						
Circles	1	5	2	1		9
Lines	15	2				17
Geometric Desings						
Serpentine Applique	1					1
Painted		1	1	1		3

Table A5: Ceramic vessel types in unit 16-2

Vessel Types	**South**			**Patio**				**North**			**TOTAL**
	Lv 1	**Lv 2**	**Lv 3**	**Lv 1**	**Lv 2**	**Lv 3**	**Lv 4**	**Lv 1**	**Lv 2**	**Lv 3**	
Pedestal Bowl											
Redware											
Rim	20	13	2	65	3			25			128
Base	14	6	1	31	3			17			72
Blackware											
Rim	25	11	2	33				3			74
Base	7	10		34				18			69
Press-Mold Base											
Redware	1										1
Blackware	2			2							4
Painted Rim											
Interior	4	4		4				6			18
Exterior	1	1									2
Bowls											
Redware	4	3		6	1			5			19
Blackware	2			9				3			14
Painted	2										2
Cups											
Redware											
Rim	5	3		13				16			37
Base	4	2		10	2			9			27
Blackware											
Rim	22	21	1	27				17			88
Base	19	3		25	2			1			50
Decorated base											
Redware											
Blackware	2										2
Parallell lines (Blackware)				3							3
Jar											
Redware	18	2	1	41	1			25			88
Incise Decoration	1										1
Blackware	4	7		2				2			15
Incise Decoration											

Table 5 (*continued*)

Vessel Types	**South**			**Patio**				**North**			**TOTAL**
	Lv 1	**Lv 2**	**Lv 3**	**Lv 1**	**Lv 2**	**Lv 3**	**Lv 4**	**Lv 1**	**Lv 2**	**Lv 3**	
Olla											
Redware	21	7	10	16		8			8		70
Blackware		1						1			2
Cambered		3		1							4
Neckless		2	1		1	1	1	9			15
Incise-Tistle handle	1	1		1				1			4
Tinaja											
Redware	3	1	1	9	1			9			24
Blackware				1							1
Handles											
Redware	15	10	2	39	4			15			85
Blackware	5	2		14	1			2			24
Painted	3			1							4
Incise				1							1
Twisted				3				1			4
Ceramic Mold				2				3			5
Tortero											

Table A6: Ceramic decoration in unit 16-2

Pottery Decoration	**South**			**Patio**				**North**			**TOTAL**
	Lv 1	**Lv 2**	**Lv 3**	**Lv 1**	**Lv 2**	**Lv 3**	**Lv 4**	**Lv 1**	**Lv 2**	**Lv 3**	
Press-Molded											
Dots and Lines	20	9		42	2			43			116
Dots	1	13	1	7				13			35
Lines	1			35	2			2			40
Geomethic Desings	1			1	1			1			4
Zoomorphic Desings	1							2			3
Parallell lines	1							1			2
Incise											
Circles				21	1						22
Lines	7	5		17				3			32
Circle and dot	1	12						25			38
Geometric Desings											
Serpentine Applique	2	1		6				3			12
Painted	6	4		10				8			28

Table A7: Ceramic vessels types in unit 16-3

Vessel Types	**North**		**South**		**TOTAL**
	Layer 1	**Layer 2**	**Layer 1**	**Layer 2**	
Pedestal Bowl					
Redware					
Rim	5	2	6	7	20
Base	5	3	4	5	17
Blackware					
Rim	13	1	6	5	25
Base	14	1	3	1	19
Press-Mold Base					
Redware	3				3
Blackware	1				1
Painted Rim					
Interior					
Exterior					
Bowls					
Redware		1		1	2
Blackware	2	1	1	1	5
Painted					
Cups					
Redware					
Rim	6		2	17	25
Base		3	2	1	6
Blackware					
Rim	7		3	6	16
Base	9	1		3	13
Decorated base					
Redware					
Blackware					
Parallell lines					
Jar					
Redware	10	4	1	4	19
Incise/Molded Decoration				5	5
Blackware	1		4	2	7
Incise Decoration					

Table A7 (*continued*)

Vessel Types	**North**		**South**		**TOTAL**
	Layer 1	**Layer 2**	**Layer 1**	**Layer 2**	
Olla					
Redware	8	9	7	5	29
Blackware					
Cambered					
Neckless		2			2
Incise-Tistle handle					
Tinaja					
Redware	9	6	7	8	30
Blackware					
Handles					
Redware	14	2	4	1	21
Blackware	3	1	1		5
Painted					
Incise	2				2
Twisted					
Ceramic Mold					
Tortero					

Table A8: Ceramic decoration in unit 16-3

Pottery Decoration	**North**		**South**		**TOTAL**
	Layer 1	**Layer 2**	**Layer 1**	**Layer 2**	
Press-Molded					
Dots and Lines	16		6	2	24
Dots	10	5		6	21
Lines			2		2
Geomethic Desings			1		1
Zoomorphic Desings					
Parallell lines					
Incise					
Circles			3	2	5
Lines		1	1	1	3
Circle and dot					
Geometric Desings					
Serpentine Applique		1		1	2
Painted					
Figurine	1				1

Table A9: Ceramic vessel types in unit 16-4

Vessel Types	Layer 1	Layer 2	Layer 3	Layer 4	TOTAL
Pedestal Bowl					
Redware					
Rim	3	20	2	2	27
Base	1	9	8		18
Blackware					
Rim		39	11	2	52
Base	2	14	5	5	26
Press-Mold Base					
Redware		1			1
Blackware		2	2		4
Painted Rim					
Interior				1	1
Exterior					
Bowls					
Redware			3		3
Blackware		2	7		9
Painted					
Cups					
Redware					
Rim	4	9	12		25
Base	1	6	7		14
Blackware					
Rim	6	15	5	6	32
Base		5	4	3	12
Decorated base					
Redware					
Blackware					
Parallell lines					
Jar					
Redware	2	7	2	7	18
Incise/Molded Decoration					
Blackware		6	4	2	12
Incise Decoration				1	1

Table A9 (*continued*)

Vessel Types	**Layer 1**	**Layer 2**	**Layer 3**	**Layer 4**	**TOTAL**
Olla					
Redware	7	8	7	9	31
Blackware					
Cambered		2	2	1	5
Neckless		4	8		12
Incise-Tistle handle		2		1	3
Tinaja					
Redware		4	2		6
Blackware					
Handles					
Redware	1	8	3	1	13
Blackware	2	4		1	7
Painted				1	1
Incise	1	1			2
Twisted					
Ceramic Mold			2		2
Tortero		3	1		4

Table A10: Ceramic decoration in unit 16-4

Pottery Decoration	**Layer 1**	**Layer 2**	**Layer 3**	**Layer 4**	**TOTAL**
Press-Molded					
Dots and Lines		47	31	9	87
Dots	7	13	8	3	31
Lines		9		3	12
Geomethic Desings					
Zoomorphic Desings		1		1	2
Parallell lines					
Incise					
Circles					
Lines	7	14	10	8	39
Circle and dot					
Geometric Desings					
Serpentine Applique		3	2	1	6
Painted		7	3	1	11
Figurine		2			2

Table A11: Ceramic vessel types in unit 16-5

Vessel Types	**Layer 1**	**Layer 2**	**Layer 3**	**TOTAL**
Pedestal Bowl				
Redware				
Rim	1	9	3	13
Base	3	6	3	12
Blackware				
Rim	7	11	11	29
Base	1	5	2	8
Press-Mold Base				
Redware			1	1
Blackware	1		2	3
Painted Rim				
Interior				
Exterior				
Bowls				
Redware		2	1	3
Blackware	1	1	1	3
Painted				
Cups				
Redware				
Rim	8	4	4	16
Base	1			1
Blackware				
Rim	4	8	5	17
Base	4	2		6
Decorated base				
Redware				
Blackware			1	1
Parallell lines				
Jar				
Redware	4	11	8	23
Incise/Molded Decoration		3	1	4
Blackware				
Incise Decoration				

Table A11 (*continued*)

Vessel Types	**Layer 1**	**Layer 2**	**Layer 3**	**TOTAL**
Olla				
Redware	5	3	4	12
Blackware				
Cambered		1	1	2
Neckless		1		1
Incise-Tistle handle				
Tinaja				
Redware	3	3		6
Blackware				
Handles				
Redware		9	3	12
Blackware		1		1
Painted				
Incise	1			1
Twisted				
Ceramic Mold				
Tortero	1			1

Table A12: Ceramic decoration in unit 16-5

Pottery Decoration	**Layer 1**	**Layer 2**	**Layer 3**	**TOTAL**
Press-Molded				
Dots and Lines	17	6	2	25
Dots	3	3	2	8
Lines		5	8	13
Geomethic Desings	1	1		2
Zoomorphic Desings				
Parallell lines				
Incise				
Circles	4	2	10	16
Lines	2	8	4	14
Circle and dot			6	6
Geometric Desings				
Serpentine Applique		2	2	4
Painted	2			2
Figurine				

Table A13: Ceramic vessel types in unit 16-6

Vessel Types	**West**				**East**									**TOTAL**
	L1	**L2**	**L3**	**L4**	**L1**	**L2**	**L3**	**L4**	**L5**	**L6**	**L7**	**L8**	**L9**	
Pedestal Bowl														
Redware)														
Rim		5				7	1	3						16
Base		1								1				2
Blackware														
Rim		6	1			5		2						14
Base			1			2		1						4
Press-Mold Base														
Redware														
Blackware						1								1
Painted Rim														
Interior		1											1	2
Exterior														
Bowls														
Redware						2			1				1	4
Blackware				2	1	1								4
Painted				1										1
Cups														
Redware														
Rim		4	1		1	1		2						9
Base		2			1	3			1					7
Blackware														
Rim		6	1	2		8		1						18
Base	1	1	1	1		2		1						7
Decorated base														
Redware														
Blackware														
Parallell lines														
Jar														
Redware	1	3				2				2	1		1	10
Incise/ Press-Molded														
Blackware						1								1
Incise Decoration														

Table A13 (*continued*)

Vessel Types	**West**				**East**									**TOTAL**
	L1	**L2**	**L3**	**L4**	**L1**	**L2**	**L3**	**L4**	**L5**	**L6**	**L7**	**L8**	**L9**	
Olla														
Redware		4	2							2	3		3	14
Blackware														
Cambered						1								1
Neckless						1	1							2
Incise-Tistle handle		1											2	3
Tinaja														
Redware	1					1								2
Blackware														
Handles														
Redware		4			1									5
Blackware		1												1
Painted														
Incise														
Twisted														
Ceramic Mold														
Tortero		1	1											2

Table A14: Ceramic decoration in unit 16-6

Pottery Decoration	**West**				**East**									**TOTAL**
	L1	**L2**	**L3**	**L4**	**L1**	**L2**	**L3**	**L4**	**L5**	**L6**	**L7**	**L8**	**L9**	
Press-Molded														
Dots and Lines	3	6				7		1					1	18
Dots		5	2		1	2						1		11
Lines						4								4
Geomethic Desings														
Zoomorphic Desings	1													1
Parallell lines														
Incise														
Circles			2								1			3
Lines		11				4								15
Circle and dot														
Geometric Desings														
Serpentine Applique														
Painted					1	3								4
Figurine						1	1							2

Table A15: Ceramic vessel types in unit 16-7

Vessel Types	Layer 1	Layer 2	Layer 3	TOTAL
Pedestal Bowl				
Redware				
Rim	6	5	1	12
Base	1	6	1	8
Blackware				
Rim	1	8	1	10
Base	2	4		6
Press-Mold Base				
Redware				
Blackware				
Painted Rim				
Interior		1		1
Exterior				
Bowls				
Redware	1	4		5
Blackware		2		2
Painted				
Cups				
Redware				
Rim	1	5		6
Base		1		1
Blackware				
Rim	6	9	3	18
Base	2	7		9
Decorated base				
Redware				
Blackware				
Parallell lines			1	1
Jar				
Redware	2	3	2	7
Incise/Molded Decoration				
Blackware	1	3	2	6
Incise Decoration				

Table A15 (*continued*)

Vessel Types	**Layer 1**	**Layer 2**	**Layer 3**	**TOTAL**
Olla				
Redware		2	2	4
Blackware				
Cambered	1	3	1	5
Neckless	1	7	1	9
Incise-Tistle handle				
Tinaja				
Redware	5	7	3	15
Blackware				
Handles				
Redware	1	2	2	5
Blackware	22	2		24
Painted				
Incise				
Twisted				
Ceramic Mold				
Tortero		1		1

Table A16: Ceramic decoration in unit 16-7

Pottery Decoration	**Level 1**	**Level 2**	**Level 3**	**TOTAL**
Press-Molded				
Dots and Lines	3	8		11
Dots	4		4	8
Lines	1	2		3
Geomethic Desings				
Zoomorphic Desings				
Parallell lines				
Incise				
Circles				
Lines	1	7		8
Circle and dot				
Geometric Desings				
Serpentine Applique		2		2
Painted	3	3	1	7
Figurine				

Table A17: Ceramic vessel types in unit 16-8

Vessel Types	**Level 1**	**Level 2**	**Level 3**	**Level 4**	**TOTAL**
Pedestal Bowl					
Redware					
Rim	18		5	2	25
Base	7	7	1		15
Blackware					
Rim	10	3	8	2	23
Base	5	5	2		12
Press-Mold Base					
Redware	2				2
Blackware	1	2	1		4
Painted Rim					
Interior					
Exterior					
Bowls					
Redware	1				1
Blackware	3	1	1		5
Painted					
Cups					
Redware					
Rim	6	3	2	2	13
Base	5				5
Blackware					
Rim	15	2	2	2	21
Base	4	3	2	2	11
Decorated base					
Redware					
Blackware					
Parallell lines			1		1
Jar					
Redware	20	6	1	2	29
Incise/Press-Molded	4	2			6
Blackware					
Incise Decoration	2				2

Table A17 (*continued*)

Vessel Types	**Level 1**	**Level 2**	**Level 3**	**Level 4**	**TOTAL**
Olla					
Redware	3	5	2	3	13
Blackware					
Cambered					
Neckless	1	1		1	3
Incise-Tistle handle					
Tinaja					
Redware	25	36	17	9	87
Blackware					
Handles					
Redware	15	3	1	1	20
Blackware	1				1
Painted					
Incise					
Twisted					
Ceramic Mold					
Tortero		1			1

Table A18: Ceramic decoration in unit 16-8

Pottery Decoration	**Level 1**	**Level 2**	**Level 3**	**Level 4**	**TOTAL**
Press-Molded					
Dots and Lines	11	1	1		13
Dots	2	12	1	2	17
Lines	9	3		1	13
Geomethic Desings	1				1
Zoomorphic Desings					
Parallell lines					
Incise					
Circles	1	1	3		5
Lines	1	2			3
Circle and dot	8	1			9
Geometric Desings					
Serpentine Applique	1				1
Painted					
Figurine	1				1

Botanic Remains

Table A19: Botanic remains in unit 15-1

Specie	South			Patio		North				TOTAL
	L1	**L2**	**L3**	**L1**	**L2**	**L1**	**L2**	**L3**	**L4**	
Pouteria lucuma	1	1			14		95	29	7	147
Inga feuillei				9			21	3		33
Persea americana	1		3				25	3	3	35
Annona cherimola	3	1	34	30			103	19		190
Annona muricota	9	1	87	115			427	75	14	728
Psidium guajava			7	18			59	14		98
Arachis hypogaea					4		26	5	11	46
Phaseolus lunatus			3	2			9			14
Phaseolus sp.										
Phaseolus sp.							5			5
Lagenaria siceraria	3	1	13	24			47	17	6	111
painted										
Gossypium bardadense			1	1			3			5
seed					6		2			8
Zea mays	17	2	46	250	72		458	42	9	896
Poaceae sp.	4	6	21	20	14		107	3		175

Table A20: Botanic remains in unit 16-1

Specie	South		North				TOTAL
	L1	**L2**	**L1**	**L2**	**L3**	**L4**	
Pouteria lucuma	94	6			3		103
Inga feuillei	19	5			2		26
Persea americana	13	3	2	6	2		26
Annona cherimola	90	4		11	5	2	112
Annona muricota	69	2		5	13	4	93
Psidium guajava	6						6
Arachis hypogaea	6						6
Phaseolus lunatus	10						10
Phaseolus sp.	3						3
Phaseolus sp.	11	2					13
Lagenaria siceraria	47	4		13	14		78
painted	1						1
Gossypium bardadense	8						8
seed	7						7
Zea mays	254	37	2	17	24	5	339
Poaceae sp.	104	3					107

Table A21: Botanic remains in unit 16-2

Specie	South			Patio					North		TOTAL
	L1	L2	L3	L1	L2	L3	L4	L5	L1	L2	
Pouteria lucuma	55	44	1	38	19				3	3	163
Inga feuillei	34	13		44	7	1			3		102
Persea americana	17	22	5	100	25				13	2	184
Annona cherimola	80	61	2	106	38				20	8	315
Annona muricota	153	88	5	130	47				11	9	443
Psidium guajava	5	2		51	11				11		80
Arachis hypogaea	4	1		7	5			2			19
Phaseolus lunatus	6			3	3						12
Phaseolus sp.				1							1
Phaseolus sp.	1										1
Lagenaria siceraria	56	46	1	86	8		13	1	22	17	250
painted		1									1
Gossypium bardadense	2	4		3	5						14
seed					1						1
Zea mays	181	87	38	417	133		10	2	35	24	927
Poaceae sp.	362	307	29	314	67	1			21	12	1113

Table A22: Botanical remains in unit 16-3

Specie	south			North		TOTAL
	Layer 1	Layer 2	Layer 3	Layer 1	Layer 2	
Pouteria lucuma	21	53		3	20	97
Inga feuillei	15	43	5	7	8	78
Persea americana	24	8		16	8	56
Annona cherimola	24	79		2	13	118
Annona muricota	27	74		2	24	127
Psidium guajava	7				3	10
Arachis hypogaea	4	11				15
Phaseolus lunatus		1			2	3
Phaseolus sp.						
Phaseolus sp.	1	2			1	4
Lagenaria siceraria	26	13		33	6	78
painted				1		1
beveled					1	1
Gossypium bardadense	5	6		12		23
seed	1	29		3		33
Zea mays	144	122		27	68	361
Poaceae sp.	50	383	4	10		447

Table A23: Botanical remains in unit 16-4

Specie	Layer 1	Layer 2	Layer 3	Layer 4	TOTAL
Pouteria lucuma	1	9	9	3	22
Inga feuillei		12	5	1	18
Persea americana	1	3	1	3	8
Annona cherimola	3	2	21	4	30
Annona muricota	4	20	45	33	102
Psidium guajava					
Arachis hypogaea					
Phaseolus lunatus					
Phaseolus sp.					
Phaseolus sp.					
Lagenaria siceraria	3	26	32		61
painted					
Gossypium bardadense			3		3
seed					
Zea mays	11	64	77	52	204
Poaceae sp.	9	49	38		96

Table A24: Botanic remains in unit 16-5

Specie	Layer 1	Layer 2	Layer 3	TOTAL
Pouteria lucuma	15	72	23	110
Inga feuillei	3	54	3	60
Persea americana	7	15	2	24
Annona cherimola	19	107	39	165
Annona muricota	28	239	59	326
Psidium guajava		3		3
Arachis hypogaea	1	2		3
Phaseolus lunatus		4	1	5
Phaseolus sp.				
Phaseolus sp.		6	2	8
Lagenaria siceraria		22	8	30
painted				
Gossypium bardadense		42	12	54
seed				
Zea mays	27	197	55	279
Poaceae sp.	22	292	33	347

Table A25: Botanic remains in unit 16-6

Specie	**Easr**		**West**		**TOTAL**
	Later 1	**Layer 2**	**Layer 1**	**Layer 2**	
Pouteria lucuma	4	11			15
Inga feuillei	4	8		1	13
Persea americana	1	2			3
Annona cherimola	1	8		3	12
Annona muricota	6	18		4	28
Psidium guajava					
Arachis hypogaea					
Phaseolus lunatus					
Phaseolus sp.					
Phaseolus sp.					
Lagenaria siceraria		14		2	16
painted					
Gossypium bardadense					
seed					
Zea mays	20	62	1	2	85
Poaceae sp.	19	50			69

Table A26: Botanic remains in unit 16-7

Specie	**Layer 1**	**Layer 2**	**Layer 2**	**TOTAL**
Pouteria lucuma	35	16		51
Inga feuillei	1	3		4
Persea americana	1	4		5
Annona cherimola	14	12		26
Annona muricota	35	25		60
Psidium guajava				
Arachis hypogaea	2			2
Phaseolus lunatus	3	18		21
Phaseolus sp.				
Phaseolus sp.				
Lagenaria siceraria	28	20	1	49
painted				
Gossypium bardadense	12	21	33	66
seeds				
Zea mays	134	141	1	276
Poaceae sp.	138			138

Table A27: Botanic remains in unit 16-8

Specie	Layer 1	Layer 2	Layer 3	Layer 4	TOTAL
Pouteria lucuma	2			1	3
Inga feuillei	1				1
Persea americana	4		2	2	8
Annona cherimola	9				9
Annona muricota	3				3
Psidium guajava					
Arachis hypogaea					
Phaseolus lunatus					
Phaseolus sp.					
Phaseolus sp.					
Lagenaria siceraria	9		1	3	13
painted					
Gossypium bardadense					
seed					
Zea mays	5	7	4		16
Poaceae sp.	2			1	3

Marine Resources

Table A28: Marine Resources in unit 15-1

Specie	Patio						North				TOTAL
	L1	L2	L3	L4	L5	L6	L1	L2	L3	L4	
Semele corrugata											
Prisogaster niger											
Tegula atra	116	46	71	30	5	3	1	43	4	6	325
Thais chocolata	1		6				1	2			10
Thais chorugta											
Fisurella limbata	10	10	9	3	2	4	2	13		5	58
Fisurella maxima	2				1		1	4			8
Choromitilus chorus											
Enoplochiton niger	186	72	91	16	3	9	17	114	17	38	563
Crab (fragments)	16	4	11				6	32	5	6	80
Concholepas concholepas	32	1	1				1	14			49
Donax obesulus	1										1
Limpets sp.											
Serimytilus algosus					4		5				9

Tabla A28 (*continued*)

Specie	**Patio**						**North**				**TOTAL**
	L1	**L2**	**L3**	**L4**	**L5**	**L6**	**L1**	**L2**	**L3**	**L4**	
Perumitilus purpuratus	107	42	81	12	2	3	18	992	21	35	1313
Scurria parasitica											
Protothaca thaca	2	1					1	6			10
Mesodesma donasium		1									1
Xantochorus buxea											
Sinum symba											
Crepipatella dilatata							1				1
Scutalus proteus											

Table A29: Marine resources in 16-1

Specie	**South**	**North**	**TOTAL**
	Layer 1	**Layer 4**	
Semele corrugata			
Prisogaster niger			
Tegula atra	61	6	67
Thais chocolata			
Thais chorugta			
Fisurella limbata	4	1	5
Fisurella maxima			
Choromitilus chorus	48	1	49
Enoplochiton niger	4	5	9
Crab (fragments)	4	2	6
Concholepas concholepas			
Donax obesulus			
Limpets sp.			
Serimytilus algosus		2	2
Perumitilus purpuratus		7	7
Scurria parasitica		1	1
Protothaca thaca			
Mesodesma donasium			
Xantochorus buxea			
Sinum symba			
Crepipatella dilatata			
Scutalus proteus			

Table A30: Marine resources in unit 16-2

Specie	South			Patio				North		TOTAL
	L1	L2	L3	L1	L2	L3	L4	L1	L2	
Semele corrugata	2	9		3	4					18
Prisogaster niger	3					17	16			36
Tegula atra	108	21	4	47	27	26	53	45	32	363
Thais chocolata		4		11	3			1		19
Thais chorugta								1		1
Fisurella limbata	11	2		11		7	9	12	3	55
Fisurella maxima		2					1	1		4
Choromitilus chorus	40	1	1	75	20			7		144
Enoplochiton niger	86	63	9	24	17	11	18	9	14	251
Crab (fragments)	35	12	2	42	41			10	3	145
Concholepas concholepas	15	19		17	4			16	1	72
Donax obesulus	2		1	1						4
Limpets sp.	5			6	4					15
Serimytilus algosus	29	4					4		1	38
Perumitilus purpuratus	77	124	11			10	32	19	42	315
Scurria parasitica	3	6				3	2		5	19
Protothaca thaca	11	6						1	1	19
Mesodesma donasium	2	1					3			6
Xantochorus buxea										
Sinum symba										
Crepipatella dilatata										
Scutalus proteus								1		1

Table A31: Marine resources in unit 16-3

Specie	South			North		TOTAL
	Layer 1	Layer 2	Layer 3	Layer 1	Layer 2	
Semele corrugata				1		1
Prisogaster niger						
Tegula atra		21	1	7	5	34
Thais chocolata		1				1
Thais chorugta						
Fisurella limbata	1	7		2	1	11
Fisurella maxima						
Choromitilus chorus						
Enoplochiton niger		32	1	15	8	56
Crab (fragments)	2	59		3	10	74
Concholepas concholepas		4		11		15

Table A31 (*continue*)

Specie	**South**			**North**		**TOTAL**
	Layer 1	**Layer 2**	**Layer 3**	**Layer 1**	**Layer 2**	
Donax obesulus						
Limpets sp.						
Serimytilus algosus	1	13		3	3	20
Perumitilus purpuratus		89	5	4	3	101
Scurria parasitica		4				4
Protothaca thaca		9		1		10
Mesodesma donasium						
Xantochorus buxea					1	1
Sinum symba						
Crepipatella dilatata						
Scutalus proteus						

Table A32: Marine resources in unit 16-4

Specie	**Layer 1**	**Layer 2**	**Layer 3**	**Layer 4**	**TOTAL**
Semele corrugata			1		1
Prisogaster niger	13	1	6		20
Tegula atra	63	21	63	26	173
Thais chocolata	1		3		4
Thais chorugta					
Thais Haemastoma	1				1
Fisurella limbata	4	4	6	4	18
Fisurella maxima			2	1	3
Choromitilus chorus			13	5	18
Enoplochiton niger	50	63	202	109	424
Crab (fragments)			39	25	64
Concholepas concholepas	4	23	26	20	73
Donax obesulus				2	2
Limpets sp.					
Serimytilus algosus		5	41	13	59
Perumitilus purpuratus	22	146	285	217	670
Scurria parasitica	2			2	4
Protothaca thaca	2		10	1	13
Mesodesma donasium	1		1		2
Xantochorus buxea			2		2
Sinum symba	2				2
Crepipatella dilatata			1	1	2
Scutalus proteus			1		1

Table A33: Marine resources in unit 16-5

Specie	**Layer 1**	**Layer 2**	**Layer 3**	**TOTAL**
Semele corrugata	4		8	12
Prisogaster niger				
Tegula atra	52	24	23	99
Thais chocolata			1	1
Thais chorugta				
Fisurella limbata				
Fisurella maxima	14	1	2	17
Choromitilus chorus		1		1
Enoplochiton niger	46	27	65	138
Crab (fragments)	33	33	10	76
Concholepas concholepas	24	20	16	60
Donax obesulus	6	2	8	16
Limpets sp.	2			2
Serimytilus algosus			4	4
Perumitilus purpuratus	9	14	20	43
Scurria parasitica	32	20	31	83
Protothaca thaca	11	3	1	15
Mesodesma donasium	2	1	2	5
Xantochorus buxea		1		1
Sinum symba				
Crepipatella dilatata				
Scutalus proteus				

Table A34: Marine resources in unit 16-6

Specie	**East**									**West**				**TOTAL**
	L1	**L2**	**L3**	**L4**	**L5**	**L6**	**L7**	**L8**	**L9**	**L1**	**L2**	**L3**	**L4**	
Semele corrugata		1									3			4
Prisogaster niger		3									6			9
Tegula atra	20	40	6	1		2			4	7	32	24	16	152
Thais chocolata		1												1
Thais chorugta														0
Thais Haemastoma			1								3			4
Fisurella limbata	1	5								1	7	3	4	21
Fisurella maxima		1									2			3
Choromitilus chorus	1													1
Enoplochiton niger	26	32	11	5		2	2		8	18	59	40	46	249
Crab (fragments)	2	6	1	1							2		3	15
Concholepas concholepas		4	1			1					1		1	8

Table A34 (*continue*)

Specie	**East**									**West**				**TOTAL**
	L1	**L2**	**L3**	**L4**	**L5**	**L6**	**L7**	**L8**	**L9**	**L1**	**L2**	**L3**	**L4**	
Donax obesulus		2											2	4
Limpets sp.														
Serimytilus algosus	1	2									14			17
Perumitilus purpuratus	17	63	10	2			2		5	10	53	14	27	203
Scurria parasitica									1		3		1	5
Protothaca thaca		2												2
Mesodesma donasium		1												1
Xantochorus buxea														
Sinum symba														
Crepipatella dilatata														
Scutalus proteus														

Table A35: Marine resources in unit 16-7

Specie	**Layer 1**	**Layer 2**	**Layer 3**	**TOTAL**
Semele corrugata	1			1
Prisogaster niger		33		33
Tegula atra	36	617		653
Thais chocolata	1	2		3
Thais chorugta				
Fisurella limbata	7	60	3	70
Fisurella maxima				
Choromitilus chorus				
Enoplochiton niger	52	97	6	155
Crab (fragments)	2	2		4
Concholepas concholepas	2	13		15
Donax obesulus		5		5
Limpets sp.				
Serimytilus algosus	9	5		14
Perumitilus purpuratus	22	140	5	167
Scurria parasitica	2	2		4
Protothaca thaca	1	6	1	8
Mesodesma donasium				
Xantochorus buxea		3		3
Sinum symba		2		2
Crepipatella dilatata				
Scutalus proteus		5		5

Table A36: Marine resources in unit 16-8

Specie	**Layer 1**	**Layer 2**	**Layer 3**	**Layer 4**	**TOTAL**
Semele corrugata					
Prisogaster niger					
Tegula atra	3	3	1		7
Thais chocolata					
Thais chorugta					
Fisurella limbata		1	2	2	5
Fisurella maxima					
Choromitilus chorus					
Enoplochiton niger					
Crab (fragments)				4	4
Concholepas concholepas		6	1		7
Donax obesulus					
Limpets sp.					
Serimytilus algosus			1		1
Perumitilus purpuratus		2	1		3
Scurria parasitica					
Protothaca thaca		1			1
Mesodesma donasium					
Xantochorus buxea					
Sinum symba					
Crepipatella dilatata					
Scutalus proteus					

Fauna Remains

Table A 37: Faunal remains in unit 15-1

Specie	**South**			**Patio**	**North**				**TOTAL**
	L1	**L2**	**L3**	**L1**	**L1**	**L2**	**L3**	**L4**	
Llama sp									
Skull									
Mandible				2					2
teeth									
Vertebra									
Scapula									
Ribs				1					1
Sacrum									
Femur									

Table A37 (continue)

Specie	**South**			**Patio**	**North**				**TOTAL**
	L1	**L2**	**L3**	**L1**	**L1**	**L2**	**L3**	**L4**	
Tibia									
Ulna									
Falanges				1		1			2
other									
Cavia porcellus									
Skull									
Bone fragment									
Fish									
Vertebra	3		1	9		65	1	10	89
No identified									

Table A38: Faunal remains in unit 16-1

Specie	Layer 1	Layer 2	Layer 3	Layer 4	TOTAL
Llama sp					
Skull					
Mandible	1				1
teeth					
Vertebra		1	1		2
Scapula					
Ribs					
Sacrum					
Femur					
Tibia					
Ulna					
Falanges					
other					
Cavia porcellus					
Skull					
Mandible	1	2		2	5
Bone fragment		5		14	19
Bird					
Bone fragment	2	6			8
Fish					
Vertebra	1	5		5	11
No identified		10	16		26

Table A39: Faunal remains in unit 16-2

Specie	South		Patio			North		TOTAL
	Level 1	Level 2	Level 1	Level 2	Level 3	Level 1	Level 2	
Llama sp.								
Skull			1					1
Mandible				1	1			2
teeth					2			2
Vertebra	1		7			4		12
Scapula								
Ribs	2		3			2		7
Sacrum								
Femur	1		3					4
Tibia	1		1					2
Ulna	2		2					4
Falanges	1							1
other								
Cavia porcellus								
Skull	5		1					6
Mandible						1		1
Bone fragment					6	2		8
Bird								
Skull			2					2
Bone fragment	7		1	2				10
Fish								
vertebra	2		5	9		1		17
No identified	25			20				45

Table A40: Faunal remains in unit 16-3

Specie	Layer 1	TOTAL
Llama sp.		
Skull		
Mandible	1	1
teeth		
Vertebra	1	1
Scapula	1	1
Ribs		
Sacrum		
Femur		
Tibia	1	1
Ulna		

Table A40 (*continued*)

Specie	**Layer 1**	**TOTAL**
Falanges	2	2
other	1	1
Cavia porcellus		
Skull		
Mandible		
Bone fragment	16	16
Bird		
Bone fragment	1	1
Fish		
vertebra	15	15
No identified		

Table A41: Faunal remains in unit 16-4

Specie	**Layer 1**	**Layer 2**	**layer 3**	**Layer 4**	**TOTAL**
Llama sp.					
Skull					
Mandible					
teeth			1		1
Vertebra					
Scapula					
Ribs			11	8	19
Sacrum					
Femur					
Tibia					
Ulna					
Falanges					
other					
Cavia porcellus					
Skull			1		1
Mandible	1	2			3
Bone fragment	3	12	5		20
Bird					
Bone fragment			3		3
Fish					
vertebra		3	133	55	191
No identified					

Table A42: Fauna remains in unit 16-5

Specie	Layer 1	Layer 2	Layer 3	TOTAL
Llama sp.				
Skull				
Mandible				
teeth			1	1
Vertebra				
Scapula				
Ribs	1			1
Sacro				
Femur				
Tibia				
Ulna				
Falanges				
other				
Cavia porcellus				
Skull		1		1
Mandible	1	1	1	3
Bone fragment	16	3	3	22
Bird				
Bone fragment				
Fish				
vertebra	3	53	64	120
No identified				

Table 43: Fauna remains in unit 16-6

Specie	Layer 1	Layer 2	Layer 3	TOTAL
Llama sp.				
Skull				
Mandible	1			1
teeth				
Vertebra		1		1
Scapula				
Ribs				
Sacro				
Femur		1		1
Tibia				
Ulna				
Falanges			5	5
other				

Table A43 (*continued*)

Specie	**Layer 1**	**Layer 2**	**Layer 3**	**TOTAL**
Cavia porcellus				
Skull				
Mandible		1		1
Bone fragment		5		5
Bird				
Bone fragment				
Fish				
vertebra				
No identified				

Table A44: Fauna remains in unit 16-7

Specie	**Layer 1**	**Layer 2**	**Layer 3**	**TOTAL**
Llama sp.				
Skull		2		2
Mandible		1		1
teeth				
Vertebra				
Scapula				
Ribs	1	4	1	6
Sacrum				
Femur	1	1	1	3
Tibia				
Ulna				
Falanges		1		1
other				
Cavia porcellus				
Skull				
Mandible	1			1
Bone fragment				
Bird				
Sacrum		2		2
Bone fragment				
Fish				
vertebra	6			6
No identified				

Table A45: Fauna remains in unit 16-8

Specie	Layer 1	Layer 2	Layer 3	Layer 4	TOTAL
Llama sp.					
Skull					
Mandible		1			1
teeth		4			4
Vertebra	4	14	2		20
Scapula				2	2
Ribs	4	10			14
Sacro		1			1
Femur	2	1			3
Tibia					
Ulna					
Falanges		6			6
other		4		2	6
Cavia porcellus					
Skull					
Mandible		3			3
Bone fragment		7			7
Fish		3		1	4
vertebra			3	1	4
No identified	11	16	1		28

Table A46: Adobe dimensions from El Campanario

Sample No	Length (cm)	Width (cm)	Hight (cm)	Unit
1	27	13	7	16-1
2	20	13	9	16-1
3	26	13	8	16-1
4	26	13	8	16-1
5	29	12	9	16-1
6	33	13	7	16-1
7	34	13	8	16-1
8	38	13	7	16-1
9	30	12	8	16-1
10	25	13	8	16-1
11	30	12	7	16-1
12	34	11	7	16-1

Table A46 (*continued*)

Sample No	**Length (cm)**	**Width (cm)**	**Hight (cm)**	**Unit**
13	35	11	8	16-1
14	26	13	8	16-1
15	34	12	8	16-1
16	32	12	7	16-1
17	34	12	9	16-1
18	35	12	8	16-1
19	23	12	9	16-1
20	32	12	7	16-2
21	28	16	8	16-2
22	36	13	9	16-2
23	28	16	7	16-2
24	20	14	7	16-2
25	34	14	8	16-2
26	22	12	8	16-2
27	36	18	9	16-2
28	30	24	9	16-2
29	17	12	6	16-2
30	19	15	10	16-2
31	28	16	8	16-2
32	19	15	9	16-2
33	30	13	8	16-2
34	30	14	9	16-2
35	40	16	9	16-2
36	25	19	8	16-2
37	22	13	8	16-2
38	20	12	8	16-2
39	20	13	10	16-2
40	23	12	8	16-2
41	24	13	9	16-2
42	22	12	9	16-2
43	22	13	8	16-2
44	26	14	8	16-2
45	20	14	7	16-2
46	19	13	8	16-2
47	34	14	9	16-4
48	34	12	8	16-4

Table A46 (*continued*)

Sample No	**Length (cm)**	**Width (cm)**	**Hight (cm)**	**Unit**
49	21	14	8	16-4
50	25	16	8	16-4
51	22	13	8	16-4
52	28	16	9	16-4
53	28	13	9	16-4
54	32	12	9	16-4
55	25	15	7	16-4
56	23	14	7	16-4
57	25	11	7	16-4
58	18	11	7	16-4
59	21	11	8	16-4
60	22	12	8	16-4
61	30	9	8	16-4
62	34	9	9	16-4
63	29	8	8	16-4
64	33	14	9	16-4
65	30	15	9	16-4
66	33	12	9	16-4
67	30	13	9	16-4
68	30	12	9	16-4
69	32	12	9	16-4
70	28	14	8	16-4
71	34	14	9	16-4
72	35	15	9	16-4
73	37	12	9	16-4
74	32	13	9	16-4
75	32	13	9	16-6
76	31	12	7	16-6
77	32	12	8	16-6
78	36	12	8	16-6
79	34	14	8	16-6
80	31	12	9	16-6
81	35	12	8	16-6
82	31	13	8	16-6
83	34	14	8	16-6

Table A46 (*continued*)

Sample No	**Length (cm)**	**Width (cm)**	**Hight (cm)**	**Unit**
84	30	15	7	16-6
85	30	15	8	16-6
86	34	18	7	16-6
87	38	15	9	16-6
88	38	12	7	16-6
89	19	12	8	16-6
90	23	14	9	16-6
91	43	18	10	16-6
92	36	13	9	16-6
93	38	17	11	16-6
94	37	12	9	16-6
95	37	19	11	16-6
96	34	12	10	16-6
97	21	12	7	16-6
98	38	16	9	16-6
99	34	12	8	16-6
100	32	18	9	16-6
101	16	7	4	16-6
102	17	7	4	16-6

APPENDIX B

FIGURES

Ceramics

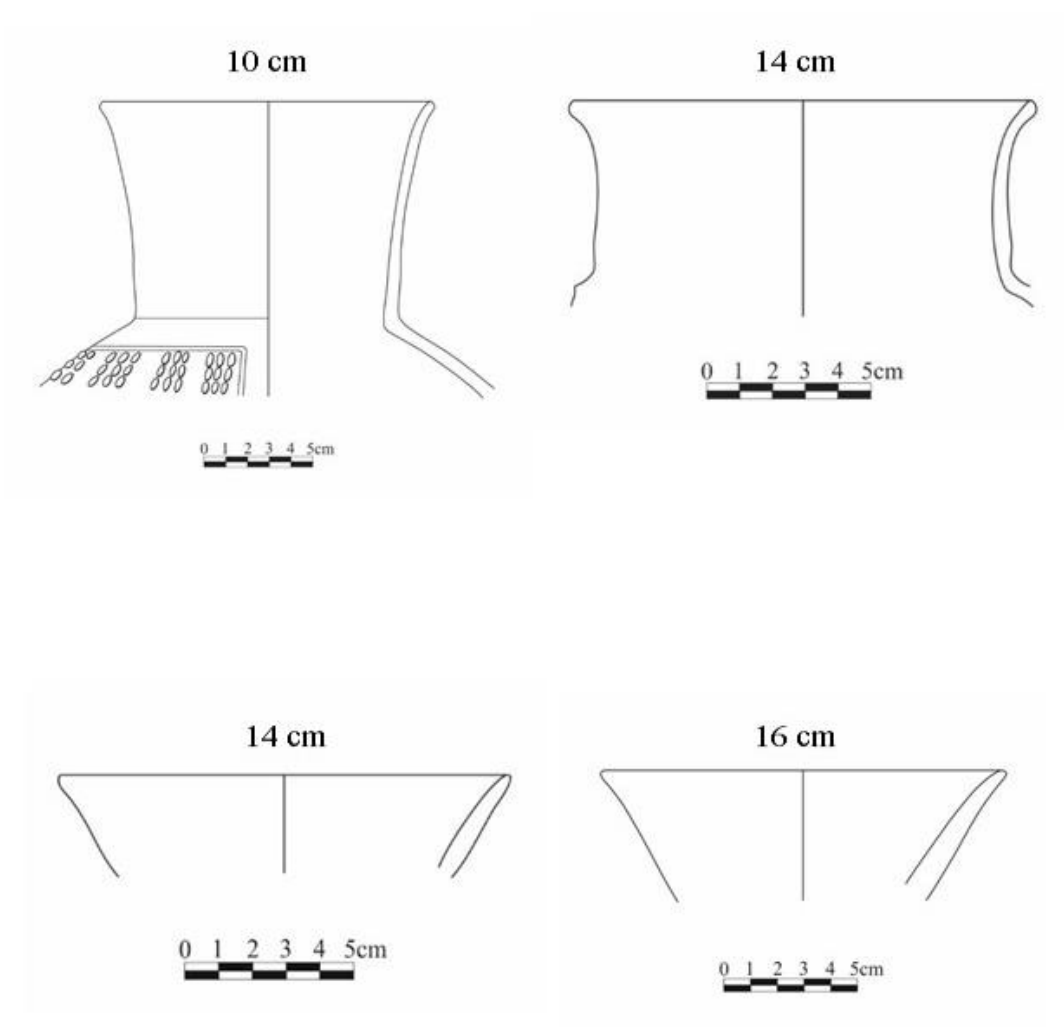

Figure B1: Types of jars recovered at El Campanario

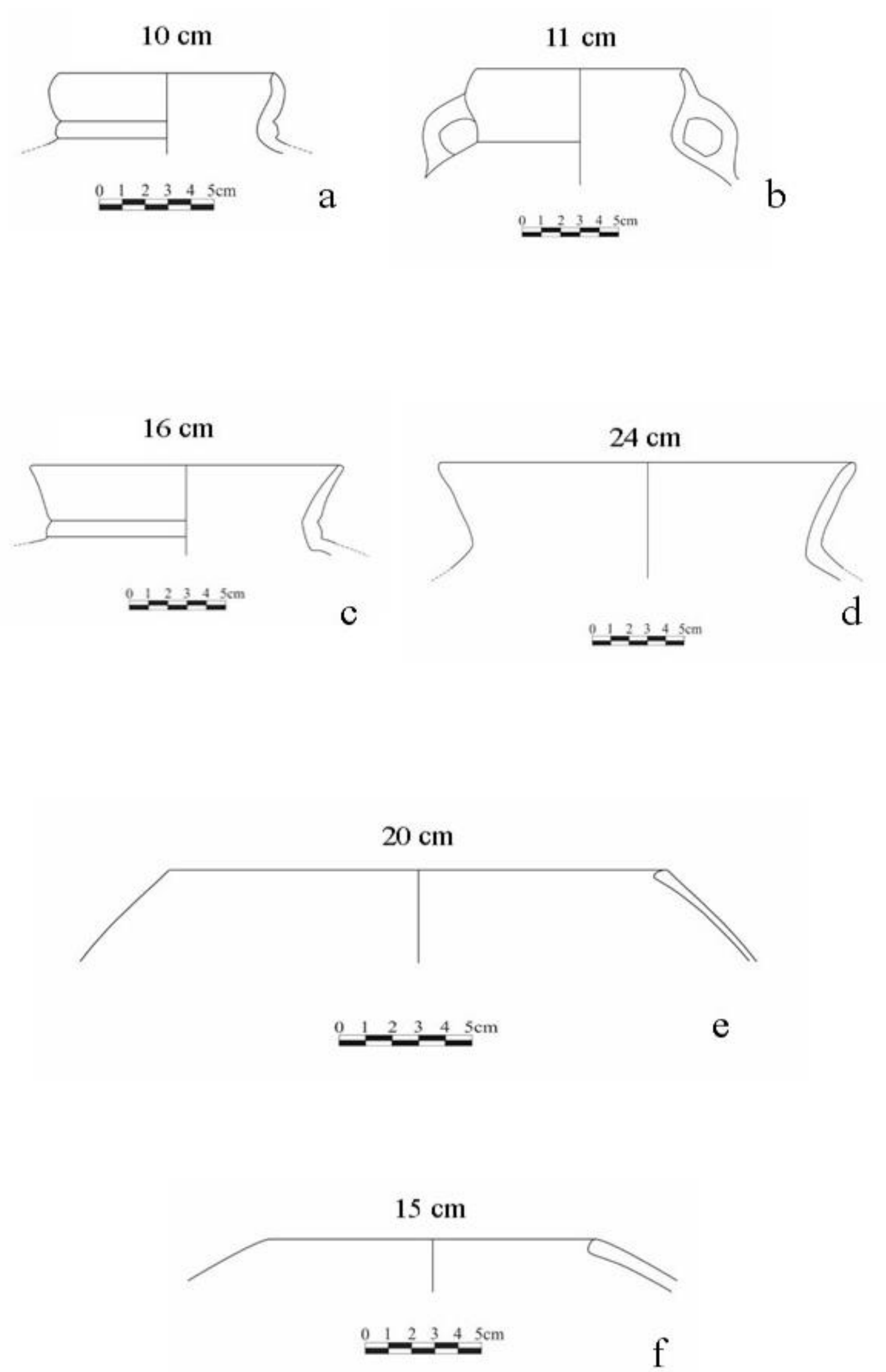

Figure B2: Types of *ollas*; a,b) convex or cambered rim, c,d) everted rim, and e,f) neckless *olla*

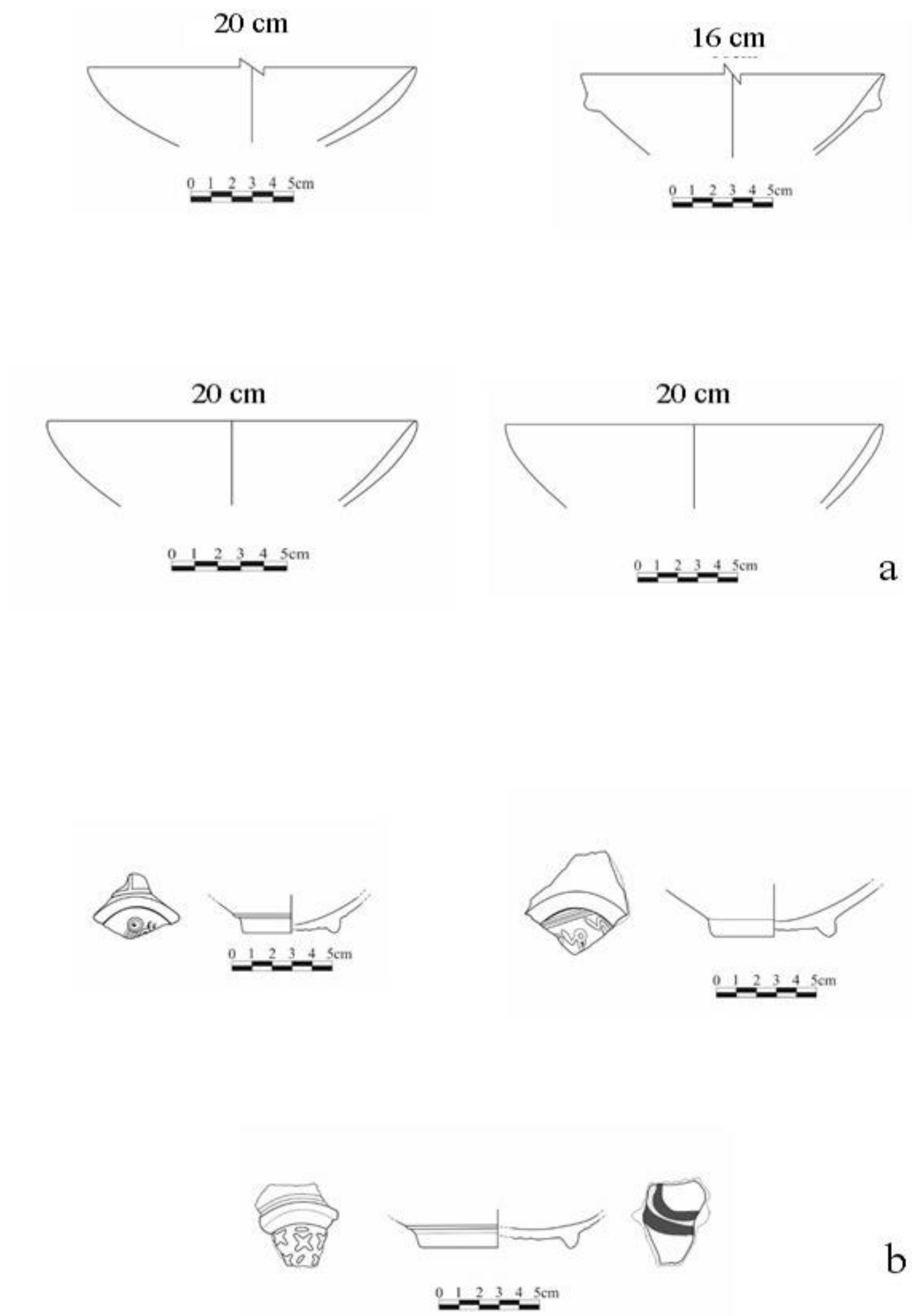

Figure B3: Pedestal bowls; a) rims and b) pedestal bowls with press-molded decoration on the base.

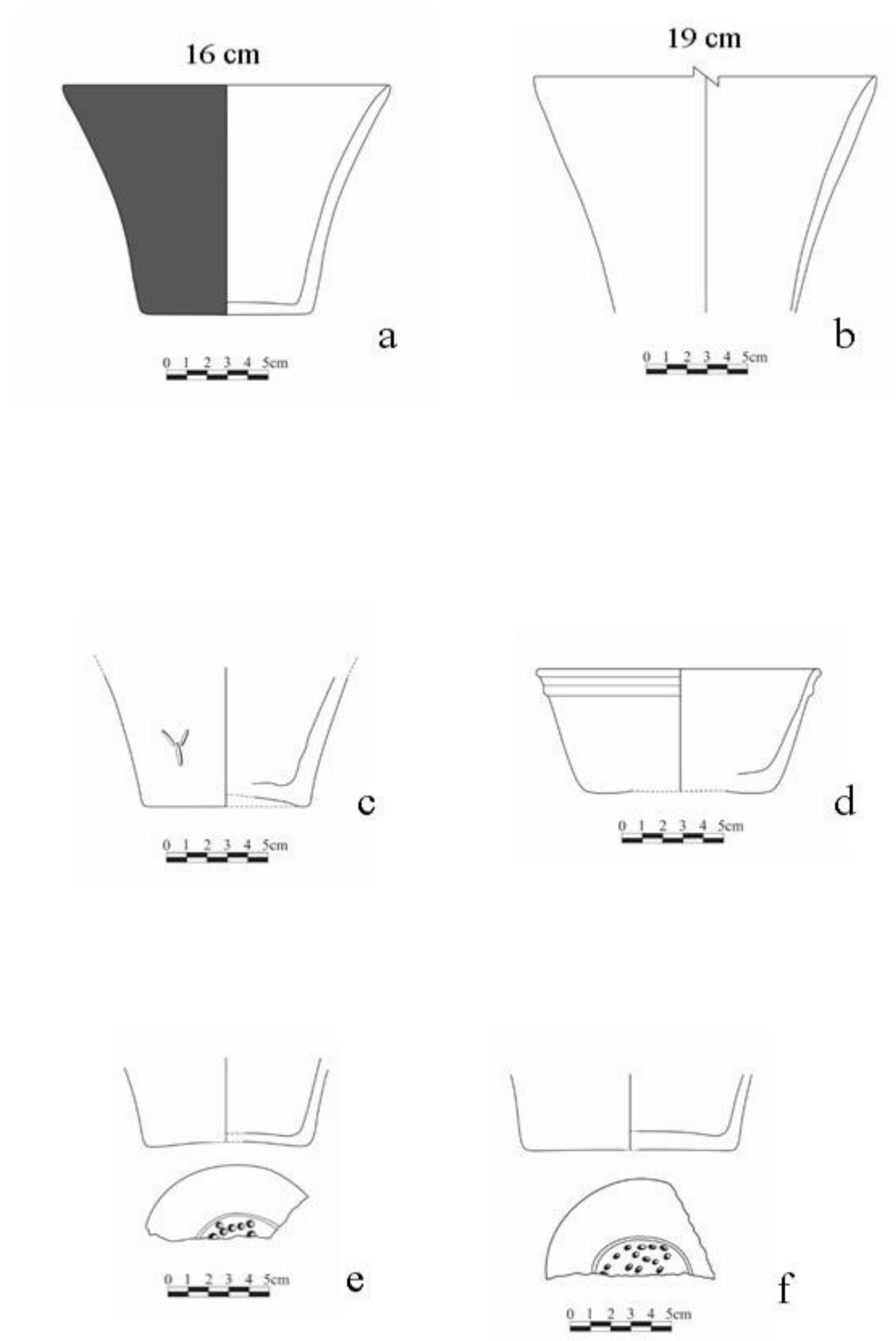

Figure B4: Types of cups from El Campanario; a,b) rims, c,d) decoration on the cup body, e,f) press-molded decoration on the base of the cup.

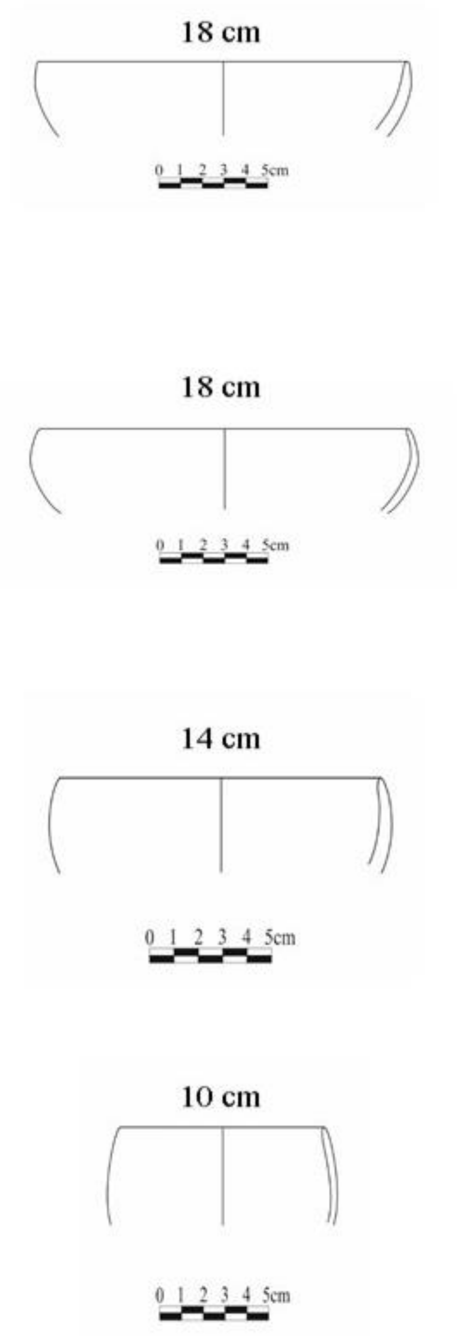

Figure B5: Types of bowls from El Campanario

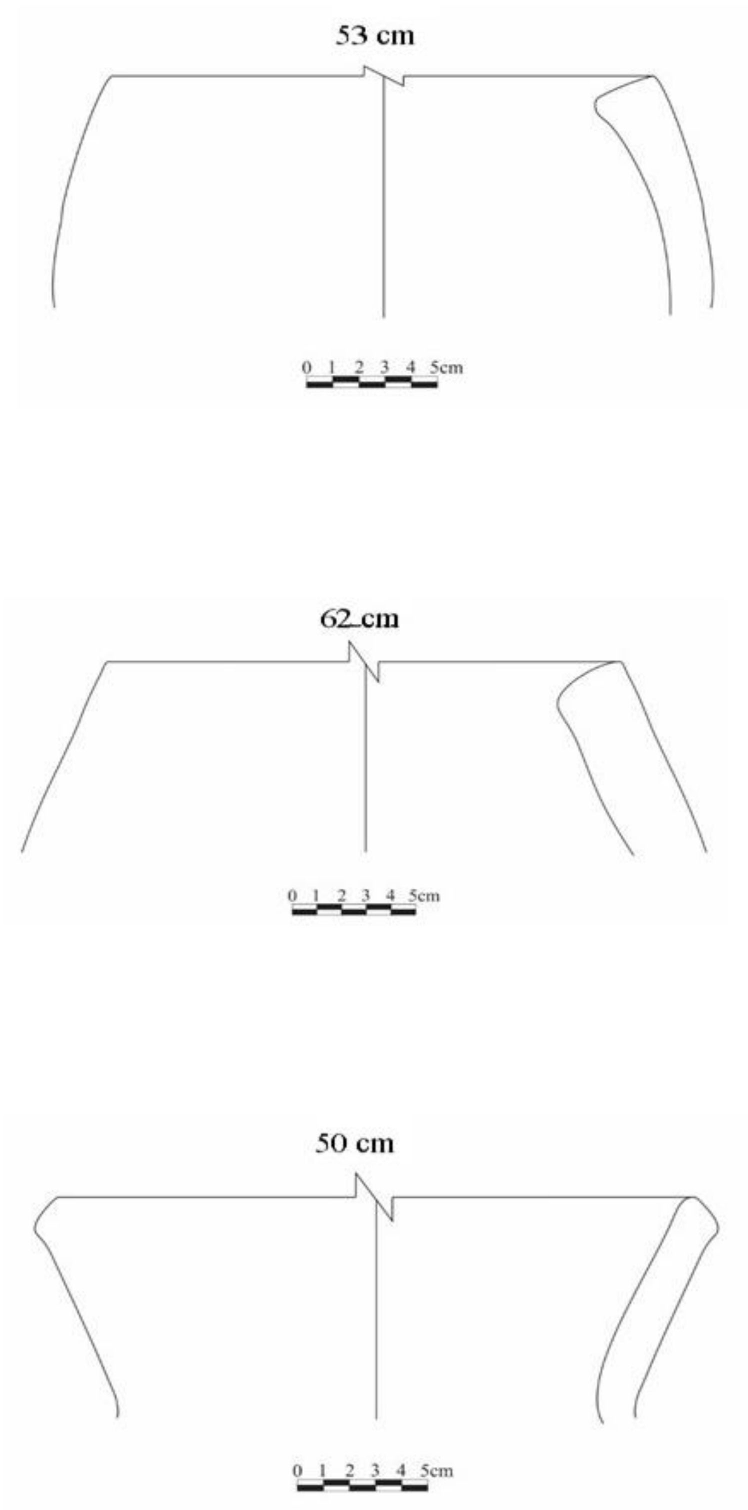

Figure B6: Types of *tinajas* from El Campanario

Figure B7: Press-molded ceramic sherds from El Campanario.

Figure B8: Incise ceramic sherds from El Campanario

Figure B9: Serpentine applique ceramic sherds from El Campanario.

Figure B10: Blackware ceramics from El Campanario

Figure B11: Pedestal Bowls with intetior painting from El Campanario.

Figure B12: Painted ceramic sherds from El Campanario.

B13: Painted ceramic sherds from El Campanario

Figure B14: Maize cobs recovered at El Campanario

Figure B15: Botanic remains; a) cotton bolls, b) lucuma seed, c) peanut.

Figure B16: Marine resurces a) Serimytilus algosus, b) Tegula atra, c) Choromitilus chorus.

Figurre B17: Fauna remains, a) *Cavia porcellus* skull, b) *Lama sp.* Mandible, c) *Lama sp.* Sacum and vertebra from El Campanario

Figure B18: Textile fragments from El Campanario.

APPENDIX C

TRACE ELEMENT ANALYSIS

Table C1: Trace element values per each ceramic sample

Sample	**Paste Group**	**Ba**	**Th**	**Rb**	**Sr**	**Y**	**Zr**	**Nb**	**Fe**
1	Group A	4207	13	51	296	25	151	11	53947
2	Group B	3095	11	67	360	26	154	8	42725
3	Group C	2216	14	76	252	25	163	8	43890
4	Group B	3091	10	55	198	25	117	8	58475
5	Group E	2625	17	76	214	30	161	10	52115
6	Group B	3785	7	44	232	30	125	10	55702
7	Group D	2578	6	57	352	25	122	10	48319
8	Group D	3360	11	58	389	28	147	8	48114
9	Group E	2674	10	69	325	26	128	10	54885
10	Group D	3614	14	57	271	27	115	7	52317
11	Group D	3068	13	51	256	32	122	9	47481
12	Group F	2299	15	92	282	26	117	11	47127
13	Group B	2321	14	74	376	26	149	9	41390
14	Group F	2445	11	87	327	25	120	9	51052
15	Group B	1996	17	57	277	25	105	7	50647
16	Group F	2045	14	58	389	27	140	8	41819
17	Group C	2531	13	69	345	24	119	9	46864
18	Group C	2592	12	49	229	25	119	9	51540
19	Group A	2808	12	59	303	25	163	7	52191
20	Group B	2836	10	61	269	26	136	10	49200
21	Group B	1789	14	64	236	24	131	7	50924
22	Group B	2255	9	48	340	26	137	8	44035
23	Group D	2773	11	73	320	22	115	8	44685
24	Group A	3519	17	77	243	31	127	7	58403
25	Group D	3056	14	54	275	27	106	6	56357
26	Group D	3811	15	54	294	29	120	8	52983
27	Group E	2904	16	55	310	29	121	8	54226
28	Group B	2371	15	67	353	27	137	7	49510
29	Group D	2612	14	60	317	27	141	12	58172

Table C1 (*continued*)

Sample	**Paste Group**	**Ba**	**Th**	**Rb**	**Sr**	**Y**	**Zr**	**Nb**	**Fe**
30	Group D	1640	12	81	329	26	199	9	49437
31	Group D	2502	14	85	265	27	169	8	51192
32	Group C	2073	14	85	265	27	169	8	51192
33	Group E	3000	10	67	358	27	125	9	49320
34	Group E	3923	14	67	292	26	114	8	60538
35	Group D	3112	12	47	438	25	224	8	46714
36	Group E	3848	16	48	194	30	118	8	59283
37	Group D	4292	16	67	390	22	214	8	54854
38	Group D	2905	14	55	402	25	129	8	50026
39	Group D	2405	15	68	353	22	145	9	47380
40	Group B	2028	14	66	232	26	129	9	54020
41	Group B	3776	10	55	217	27	117	8	61533
42	Group D	2327	13	56	387	28	223	9	47238
43	Group F	2423	11	67	372	28	131	8	46666
44	Group A	2270	9	52	227	23	90	7	57051
45	Group C	2993	11	59	339	24	176	8	49344
46	Group F	3393	12	61	290	25	135	7	55342
47	Group B	3144	15	71	264	30	152	7	60138
48	Group F	3026	5	61	303	25	135	7	51575
49	Group D	1905	14	68	250	31	114	7	47894
50	Group B	2749	11	64	337	22	114	10	54317
51	Group F	3753	12	67	399	24	145	9	50405
52	Group F	3296	9	72	316	25	135	7	54201
53	Group B	3437	11	63	449	31	194	11	51073
54	Group F	3449	13	77	316	23	125	7	49531
55	Group F	3112	14	69	306	25	105	9	51830
56	Group C	3078	10	56	415	24	140	8	48440
57	Group C	2990	11	63	394	28	155	10	53955
58	Group D	2480	8	66	258	24	130	8	56389
59	Group D	3611	7	66	422	28	220	10	52740
60	Group B	2354	16	57	319	33	174	11	48967
61	Group C	4195	14	59	238	29	133	9	52813
62	Group D	3053	15	59	309	29	180	9	52731
63	Group D	2742	12	54	384	30	109	8	45486
64	Group D	2702	15	64	353	27	118	7	52870
65	Group B	3147	16	55	385	30	182	8	49271
66	Group F	2896	13	62	365	21	128	8	50413
67	Group F	3012	13	60	278	30	207	8	52651

Table C1 (*continued*)

Sample	**Paste Group**	**Ba**	**Th**	**Rb**	**Sr**	**Y**	**Zr**	**Nb**	**Fe**
68	Group A	2925	14	75	253	28	147	8	52703
69	Group A	3098	15	68	241	29	210	11	55874
70	Group F	3786	11	68	332	27	120	11	51489
71	Group C	2175	3	70	414	19	109	10	45181
72	Group B	2709	14	69	247	27	116	7	57581
73	Group D	2333	14	60	444	24	122	7	41594
74	Group D	3804	11	65	248	26	129	9	53014
75	Group D	3774	10	53	361	26	138	10	42705
76	Group B	2554	13	60	369	20	112	7	47535
77	Group E	2525	11	61	415	24	130	8	35947
78	Group F	3502	14	70	313	28	164	11	57765
79	Group B	3084	5	63	341	23	118	10	56767
80	Group C	3010	10	66	273	25	113	10	56526
81	Group C	2219	14	62	361	24	143	7	50021
82	Group F	2746	15	64	309	23	111	9	48866
83	Group A	3903	13	52	264	26	115	7	61903
84	Group B	2649	4	64	394	24	115	9	46008
85	Group D	2915	9	67	397	27	143	10	50942
86	Group D	2657	11	58	299	24	144	10	50791
87	Group B	3037	11	60	246	26	87	8	60979
88	Group C	3555	11	64	463	26	147	7	43713
89	Group B	3051	9	74	247	23	153	8	62471
90	Group B	2409	13	58	410	26	106	8	49324
91	Group B	2133	9	62	213	23	167	8	52132
92	Group A	4533	8	59	238	28	140	7	59839
93	Group B	3223	7	62	317	28	114	14	59254
94	Group D	2358	11	93	373	28	155	8	43763
95	Group F	3013	11	82	289	27	147	8	55101
96	Group E	2702	12	58	353	31	111	6	52214
97	Group B	4634	17	51	257	31	143	11	61761
98	Group F	2732	16	60	382	26	125	10	50876
99	Group F	2926	16	63	397	29	117	9	47771
100	Group C	2310	14	59	385	20	101	5	44310
101	Group F	2825	12	61	282	30	154	9	52048
102	Group D	3099	13	47	217	33	169	8	56719
103	Group A	3580	14	54	230	28	116	7	58738
104	Group F	2080	12	60	359	29	145	8	47387
105	Group B	2514	18	75	348	31	109	13	52232

Table C1 (*continued*)

Sample	**Paste Group**	**Ba**	**Th**	**Rb**	**Sr**	**Y**	**Zr**	**Nb**	**Fe**
106	Group D	3387	12	67	430	28	118	9	46300
107	Group E	1974	14	69	242	27	158	10	43980
108	Group F	2852	12	65	360	18	124	10	48794
109	Group D	2248	13	52	313	32	117	8	51352
110	Group D	2431	14	64	258	23	112	8	52014
111	Group F	2142	15	57	325	24	121	7	48756
112	Group F	2093	18	61	329	21	95	7	43577
113	Group D	2526	11	60	296	24	150	8	47679
114	Group B	2166	14	70	230	23	108	9	54822
115	Group B	3538	11	63	238	29	114	8	57747
116	Group D	2601	16	60	307	28	120	9	52688
117	Group F	2543	9	61	339	28	133	10	52192
118	Group D	2929	9	54	437	25	137	9	54874
119	Group D	2853	15	74	386	22	109	11	49074
120	Group C	2596	17	68	297	28	173	7	52973
121	Group B	2234	12	67	324	20	105	10	47388
122	Group D	2406	14	71	323	21	122	11	48974
123	Group F	2729	8	62	312	28	123	11	49313
124	Group B	3230	17	59	374	24	130	7	48838
125	Group E	2768	11	60	358	24	124	9	46797
126	Group B	2696	13	66	271	29	145	10	57863
127	Group B	3332	10	68	328	26	128	8	54459
128	Group B	2200	19	67	224	23	93	9	50965
129	Group B	2912	11	62	400	27	185	11	48073
130	Group A	3032	12	65	250	30	204	9	54428
131	Group A	2262	18	87	338	27	151	11	42240
132	Group B	2317	13	61	293	26	220	9	48529
133	Group F	2808	12	62	379	28	167	9	53256
134	Group B	3177	10	54	189	32	163	9	58887
135	Group E	3251	11	76	276	25	137	9	57728
136	Group E	3442	14	57	251	24	115	5	56676
137	Group E	3086	8	54	205	26	138	7	56930
138	Group E	2840	9	57	229	26	102	7	55399
139	Group F	2284	10	60	432	21	140	10	47225
140	Group B	3393	17	69	327	27	172	7	55195
141	Group E	3549	16	59	304	28	288	12	49736
142	Group E	3552	10	64	200	27	107	9	54901
143	Group A	3558	10	70	214	26	168	8	53812

Table C1 (*continued*)

Sample	Paste Group	Ba	Th	Rb	Sr	Y	Zr	Nb	Fe
144	Group B	3669	11	49	240	33	160	9	59087
145	Group F	2714	12	75	254	26	96	7	52858
146	Group B	2486	11	63	444	26	121	9	44601
147	Group B	3730	18	72	367	29	176	9	61577
148	Group B	2172	9	58	377	24	142	10	46250
149	Group E	4105	10	64	247	30	100	7	59045
150	Group C	2968	8	56	257	22	150	9	50513
151	Group B	2798	9	67	405	23	130	11	64314
152	Group C	2175	11	92	490	21	142	10	31275
153	Group B	3129	9	58	361	21	119	6	46153
154	Group B	3023	10	61	318	25	113	9	50074
155	Group D	2261	12	72	291	32	146	11	41365
156	Group D	2885	8	60	225	25	121	10	54230
157	Group D	2046	4	67	364	23	119	9	45833
158	Group B	3817	10	54	196	23	131	9	55118
159	Group F	1960	10	61	316	21	121	9	51653
160	Group D	3239	10	53	291	25	114	11	53236
161	Group B	4051	10	53	226	25	121	7	57048
162	Group B	3093	11	64	285	23	135	12	57757
163	Group B	2445	7	77	313	22	112	10	46711
164	Group A	2979	8	47	231	23	129	8	51821
165	Group F	2931	17	110	347	25	115	16	47302
166	Group D	2477	10	63	338	25	187	11	53698
167	Group C	2548	12	86	407	25	180	12	42765
168	Group B	3048	9	69	371	23	135	10	47086
169	Group B	2471	8	54	241	28	99	9	58750
170	Group D	3735	8	58	239	25	132	7	55360
171	Group D	2833	7	64	338	24	113	12	51512
172	Group D	2428	7	63	414	21	132	9	49042
173	Group D	3353	9	60	392	24	156	9	50579
174	Group B	3680	11	62	348	26	130	8	62104
175	Group B	2665	10	68	359	26	114	6	40069
176	Group D	3753	10	60	401	26	113	8	49008
177	Group B	2633	10	75	360	24	173	13	48996
178	Group D	2662	7	62	372	24	131	7	35935
179	Group B	4787	13	65	376	28	195	10	55354
180	Group A	1707	8	81	245	20	138	11	47629
181	Group D	3443	7	51	363	21	181	8	51331

Table C1 (*continued*)

Sample	**Paste Group**	**Ba**	**Th**	**Rb**	**Sr**	**Y**	**Zr**	**Nb**	**Fe**
182	Group E	2207	13	87	276	27	170	9	47391
183	Group B	2053	6	59	337	22	141	10	51922
184	Group F	2935	14	67	323	23	130	8	64210
185	Group D	3144	6	73	272	23	131	11	53956
186	Group D	2839	8	48	309	28	119	8	55622
187	Group E	3567	6	51	251	28	154	10	59942
188	Group D	2517	12	79	348	27	113	10	44955
189	Group E	3595	9	44	276	28	136	8	56146
190	Group E	3073	12	60	346	26	148	12	52491
191	Group E	3816	7	56	406	25	104	11	51807
192	Group C	4767	9	45	351	33	137	8	57757
193	Group C	3357	4	62	368	19	122	9	47751
194	Group F	2996	10	58	244	23	133	9	54813
195	Group C	2918	12	73	361	24	120	9	49711
196	Group E	3907	7	56	281	28	134	7	61383
197	Group B	3532	10	64	290	26	88	7	62005
198	Group D	2810	13	65	382	30	243	9	53800
199	Group A	4232	9	58	214	27	94	7	60704
200	Group C	3075	8	52	281	24	131	9	55580
201	Group D	3374	13	78	378	25	131	10	62880
202	Group D	3873	7	47	315	26	127	9	59867
203	Group F	2884	13	65	448	26	130	8	47230
204	Group B	2295	11	93	309	33	156	11	47954
205	Group B	3160	13	98	250	31	186	9	60602
206	Group B	2262	15	108	256	29	187	15	42820
207	Group B	3282	11	62	380	26	224	11	53263
208	Group B	2832	10	61	357	25	117	8	52041
209	Group A	3350	10	68	259	25	149	6	50936
210	Group C	3371	9	59	243	26	159	11	62948
211	Group B	3879	9	56	237	28	133	7	55523
212	Group B	2742	11	83	386	20	137	9	48983
213	Group E	5000	7	53	301	30	171	12	63292
214	Group F	4188	10	65	293	22	115	11	51757
215	Group E	3695	6	53	238	27	127	7	52836
216	Group B	3263	7	74	301	22	126	9	51968
217	Group B	4235	11	64	402	27	118	9	52408
218	Group B	2878	7	65	410	23	110	11	48627
219	Group B	3428	8	70	415	27	194	11	56506

Table C1 (*continued*)

Sample	**Paste Group**	**Ba**	**Th**	**Rb**	**Sr**	**Y**	**Zr**	**Nb**	**Fe**
220	Group A	3819	10	63	230	31	184	11	57739
221	Group D	3254	6	65	366	21	107	9	60973
222	Group C	2672	7	65	375	21	107	9	46396
223	Group A	2821	0	62	256	31	134	8	53409
224	Group A	4563	9	64	290	34	105	9	62317
225	Group D	4716	14	65	375	28	297	11	54402
226	Group A	4270	9	65	255	26	218	11	67369
227	Group A	3568	10	65	269	27	144	8	55985
228	Group B	2671	9	93	239	25	175	12	57224
229	Group B	3002	8	58	412	25	136	10	47269
230	Group D	3350	9	64	470	27	120	8	52960
231	Group E	3986	9	67	351	30	222	9	57072
232	Group B	3185	7	54	226	25	151	8	52091
233	Group B	2449	7	64	310	24	155	9	48210
234	Group E	4545	8	66	248	27	120	10	60065
235	Group B	4623	9	72	240	29	157	10	62952
236	Group B	3749	8	76	271	26	143	9	55193
237	Group B	3099	7	68	283	23	118	9	53358
238	Group D	4327	9	57	293	27	129	10	57664
239	Group D	3423	8	73	364	21	164	12	54908
240	Group E	2363	8	82	277	26	184	9	50784
241	Group C	4737	3	48	249	31	122	8	59454
242	Group B	5047	7	49	269	24	151	8	63025
243	Group C	3300	6	56	257	25	150	6	58990
244	Group B	3441	5	61	364	28	110	10	56467
245	Group C	3124	5	56	335	26	121	7	49979
246	Group D	3278	11	65	351	23	115	8	56483
247	Group C	3133	8	69	343	27	216	12	51713
248	Group D	2896	4	60	392	24	136	6	47314
249	Group B	2368	11	75	253	28	161	9	44891
250	Group B	3773	7	62	364	23	111	8	57713
251	Group B	3165	6	46	262	25	137	8	62681
252	Group B	3816	9	64	368	23	187	8	55775
253	Group D	2964	7	76	306	26	108	8	60955
254	Group B	2515	6	61	283	28	207	12	48908
255	Group E	3125	9	62	361	22	114	9	51270
256	Group F	3274	5	68	349	27	186	10	52676
257	Group B	2545	10	102	309	25	140	10	48023

Table C1 (*continued*)

Sample	**Paste Group**	**Ba**	**Th**	**Rb**	**Sr**	**Y**	**Zr**	**Nb**	**Fe**
258	Group D	2702	6	71	230	22	148	8	49201
259	Group E	4006	4	50	192	27	150	6	60202
260	Group F	2058	6	63	335	25	121	8	44570
261	Group B	4397	10	61	398	25	167	11	54893
262	Group B	1839	7	71	424	26	130	9	47565
263	Group E	4108	9	75	207	28	205	11	63286
264	Group B	1994	10	86	319	28	156	8	43892
265	Group E	3959	8	40	333	19	128	10	45470
266	Group E	3719	4	65	227	29	112	9	61924
267	Group E	3635	4	55	238	25	115	6	65845
268	Group B	2436	10	68	367	20	112	9	48396
269	Group B	2950	18	65	361	31	146	9	51018
270	Group E	5438	7	49	207	26	120	7	64074
271	Group B	2003	8	72	406	28	149	8	41443
272	Group E	3255	14	61	239	26	154	7	58083
273	Group A	4162	13	57	240	24	124	7	58784
274	Group D	3116	10	74	279	29	250	10	50589
275	Group B	4651	4	68	377	24	121	12	54143
276	Group B	2768	10	71	377	27	140	10	49737
277	Group D	2796	9	76	371	23	97	8	53317
278	Group E	3725	8	49	215	25	116	11	62781
279	Group F	3525	11	70	402	23	135	10	46862
280	Group B	3735	13	58	217	24	102	9	62466
281	Group B	3330	12	55	327	22	108	11	51967
282	Group F	4442	10	65	328	25	122	9	52992
283	Group D	4386	8	63	293	28	218	11	61724
284	Group B	3632	3	59	425	25	117	9	51661
285	Group F	3971	9	69	363	28	133	9	56531
286	Group A	4163	10	71	244	24	141	11	61129
287	Group C	3177	9	68	695	29	137	8	56303
288	Group B	4279	5	52	267	20	125	7	56527
289	Group C	3937	7	63	369	26	143	6	58068
290	Group F	2965	8	77	278	26	117	8	53826
291	Group B	3650	12	70	297	23	165	10	58673
292	Group F	3051	9	77	306	24	140	9	53724
293	Group F	2535	11	85	281	20	114	10	61629
294	Group E	3707	9	53	248	27	152	9	60267

Table C1 (*continued*)

Sample	**Paste Group**	**Ba**	**Th**	**Rb**	**Sr**	**Y**	**Zr**	**Nb**	**Fe**
295	Group B	3102	7	56	350	29	195	11	54118
296	Group C	3549	5	51	262	26	140	9	62115
297	Group B	4671	9	61	408	33	361	13	54043
298	Group B	3206	8	50	439	23	213	10	48202
299	Group B	3311	10	65	264	28	165	7	58317
300	Group F	3932	7	64	273	24	131	9	57199