PREHISPANIC SOCIAL ORGANIZATION IN THE JAMASTRÁN VALLEY, SOUTHEASTERN HONDURAS

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This research explores the social organization of prehispanic communities in the Jamastrán Valley in Southeastern Honduras. It reconstructed the demographic patterns of a 250 km^2 region through a full coverage systematic survey. Our ceramic evidence indicates that the Jamastrán Valley was occupied between about 600 and 1000 AD. Therefore, the analysis in the chapters that follow is fundamentally synchronic since it deals with a single period of occupation which ceramic analysis does not, at present, enable us to subdivide.

Evidence derived from the comparison of different social trajectories in regions of western, central, and eastern Honduras, points to three common factors that stand out as crucial elements for understanding the development of social hierarchies in those regions; access to prime agricultural land, craft production and local exchange and interregional interactions. Each of these factors can be understood as components of two basic political strategies: economically or prestige-based ones. The articulation or combination of these factors, and the ability to connect economic and prestige strategies to each other, enabled the consolidation of permanent forms of social inequality in many regions of prehispanic Honduras.

We suggest that the demographic history of the Jamastrán Valley is related to processes of acute political centralization, population growth and expansion of interregional exchange networks in west-central and eastern Honduras beginning at around 500 AD, and to opposite processes (political decentralization, disruption of existing exchange networks, and population dispersal) later in the social trajectories of most archaeologically known regions in Honduras. Our research in Jamastrán also indicates that local aspiring leaders in the valley seem to have failed to articulate in a complementary fashion both economic and prestige-based strategies in order to strengthen their social status. We propose that hierarchical structures in the Jamastrán Valley were incipient and that their frailty is reflected in the communities´ inability to resist

and/or adapt to the pressures toward decentralization and population dispersion experienced throughout prehispanic Honduras between 900 and 1000 AD.

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PREFACE

This research was financially supported by a Dissertation Improvement Grant from the National Science Foundation and an International Studies Research Grant from the University of Pittsburgh´s Center for Latin American Studies. Our work was also possible thanks to the collaboration of the Instituto Hondureño de Antropologia e Historia (IHAH). The author wishes to thank Carmen Julia Fajardo and Winifred Creamer for their constant support and encouragement before, during and/or after field work. Thanks also to Ranferi Juarez for his invaluable help during the lithic analysis; to Leonel González and Pastor Gómez for providing important information for my research. Claudia Rivera, Viviana Siveroni, Lauren Herckis, and Maria Auxiliadora Cordero have been supportive friends during different stages of the graduate program. Gracias especiales Mariauxi. Thanks to the field work crew for their hard work and enthusiasm. Special thanks go to my sister, Mimy, who was pivotal for the completion of the field work. Many thanks to Phyllis Deasy for her help during all my years in Pitt.

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1. Theoretical Background

Archaeologists have described the position of Honduras in terms of its frontier-like setting: it lies on the southern periphery of Mesoamerica and on the northern edge of the Intermediate Area (e.g. Baudez 1970, Healy 1984, Lara and Hasemann 1989). From this perspective, eastern Honduras has been characterized as a frontier within a frontier area; receiving ¨filtered¨ Mesoamerican traditions from the west and Lower Central American influences from the southeast. Nonetheless, eastern Honduras has been typically associated with the Intermediate Area, and most archaeological research in the region has been guided by this assumption. Discussions about the utility of the Intermediate Area as an accurate theoretical construct have been offered amply elsewhere (Lange 1984, 1992, Sheets 1992, Hoopes 1992, Drennan 1996); and expanding on those discussions escapes the purpose of this research. However, this research does aim to contribute to current efforts to move the discussion from a traditional emphasis on determining cultural affiliation in eastern Honduras to approaches that focus attention on internal social dynamics at regional scales of analysis.

1.1 Changes in Research Questions in West-Central and Eastern Honduras

Hasemann (1998:30) has summarized the history of research in west-central Honduras centering his argument on the shift in theoretical and methodological orientations from a ¨focus almost exclusively of necessity on such pragmatic chores as the identification and inventory of material culture and the basic chronology of culture history, usually linked to the rise, florescence and decline of Mesoamerican traditions, especially the Olmec and the southern Lowland Maya,¨ to more recent topics that have concentrated on the regional distinctiveness of local societies, the transfer of goods and information between regional polities (Henderson 1977, Ashmore 1987, Urban and Schortman 1987, Dixon 1989), the politics of economic organization (Schortman and Urban 1991), the social aspects of political organization and ethnicity (Joyce 1991, Creamer 1987), the relationship between subsistence resources and spatial pattering of settlement systems and their implications for the interpretation of sociopolitical organization (Pope 1987, Locker 1989, Hirth et al., 1989).

Archaeological research in eastern Honduras has been less intensive, but parallels the general changes in theoretical and methodological interests observed in west-central Honduras and the Intermediate Area. The first non-systematic surveys and excavations carried out in northeastern and eastern Honduras provided data to create a ceramic sequence for the region, still utilized today, and offered assessments of the cultural affiliation of the prehispanic societies of eastern Honduras (Strong 1934, 1935, Stone 1941, 1954, Epstein 1957). The first systematic work in the area was conducted by Healy in the 1970's. Healy's research in northeastern Honduras (1973, 1975, 1976, 1977, 1978), included subsistence and settlement pattern studies which were considered at that time new approaches in the archaeology of the country. Along those studies, issues about cultural affiliation remained important research questions in the region (Healy 1984).

More recently, researchers have focused their attention on the nature of interregional interactions between eastern and west-central Honduras, and Lower Central America (Hasemann and Lara 1991, Healy 1992, Begley 1999). Healy (1992) has explored the differences in social organization between western and eastern Honduras, pointing out that more complex levels of social organization are observed late in the cultural sequence of northeastern Honduras, almost coinciding with the appearance of non-Mesoamerican materials in the archaeological record of the region. The implications of such evidence for understanding the development of social complexity in northeastern Honduras, in contrast to other regions, have not been fully investigated yet.

Recent research in eastern Honduras has focused on local developments and the emergence of social differentiation in the region. Begley (1999), based on Helms' (1979) work, has proposed that long-distance relationships of non-economic nature played a critical part in the social development of eastern Honduras. Specifically, the construction of ballcourts and adoption of related rituals by the nascent elites of eastern Honduras are thought to be crucial elements in processes of power acquisition and hierarchy building. The presence of strong Mesoamerican features, such as ballcourts, in eastern Honduras has introduced a different line of inquiry in the region, particularly regarding aspects of interregional interaction and its effect on local social dynamics.

1.2 Research Objectives

This research attempts to gain an understanding of prehispanic social organization in the Jamastrán Valley, in Southeastern Honduras. It shares the opinion that the study of societies benefits greatly when approached in terms of varying levels of sociopolitical integration (Steward 1955, Parkinson 2002, Peterson and Drennan 2005). Therefore, in order to characterize the processes of social organization in the Jamastrán Valley, this research will explore two interrelated analytical dimensions: political integration and nature of social interaction.

Survey data is used to address the degree of sociopolitical integration, or autonomy, present in the region and evaluate the occurrence and extent of hierarchical social interactions. The former will be assessed by determining the scale and organization of the basic integrative units that make up the social system under study. The latter will be studied by exploring contrasting political strategies utilized by aspiring leaders as springboards of social differentiation: economic-oriented strategies, which involve restricted access over basic resources, and/or the control of the production or mobilization of valued items, and; prestige- oriented strategies, which involve mechanisms such as restricted access to privileged knowledge, manipulation of symbols and prestige goods, participation in interregional exchange networks, feasting, etc.

This research is concerned with the study of processes of social organization in the Jamastrán Valley. It attempts to evaluate the presence and relative importance of economic and prestige based strategies in the development of social differentiation in the region. It does not attempt to establish generalizations about eastern Honduras but to provide a particular case study for comparative purposes.

1.3 Bases of Social Hierarchy: Economic-Based and Prestige-Based Strategies

One of the main concerns of scholars interested in explaining the emergence of social inequality is the identification of what constitutes the foundation of social differentiation in developing complex societies; in other words, what the basis of political leadership and subsequent social inequality is. Classic evolutionary explanations (Sahlins 1963, Fried 1967, Service 1968) attributed prestige- based strategies to ¨big-man societies¨, ¨simple chiefdoms¨ and ¨rank societies¨, and economic control or wealth-based strategies to ¨stratified societies¨ and ¨states,¨ the former being predecessors of the latter accordingly to sequential stages of development. In contrast, more recent scholarship on social complexity has emphasized that control over basic resources is important even in societies with simple hierarchies (Earle 1978, Gilman 1981, 1991) and that different political strategies can coexist and even reinforced one another (D'Altroy and Earl 1985, D'Altroy 1992, Earl 1997).

Aspiring leaders might seek to gain social leverage through the control of productive resources or consumptive goods. Differential access to land, control over labor and craft production have been closely related to wealth accumulation by emerging elites (Fried 1967, Earle 1978, 1987, 1997, Gilman 1981, Ericson and Earle 1982, Brumfiel and Earle 1987). In particular, restricted access to land has been identified as one the main sources of social differentiation in complex societies (Coe 1974, D'Altroy and Earl 1985, Earle 1987, 1991, McAnany 1992, 1993). Control over this basic resource, and the surplus it generates, enables leaders to finance their projects and bolster their social status (D'Altroy and Earl 1985).

McAnany (1993) has claimed that in complex societies, the source of social inequality is related to the elite monopolization of prime agricultural land. One of the main arguments of McAnany's ¨founder effect model¨ is that as regions grow demographically, the households, or settlements for that matter, located on prime agricultural land from earlier periods will create a basis for wealth not able to be replicated by others. Consequently, the model argues, the oldest settlements will establish a monopoly on the most productive land and, as population increases, assimilate newly arrived settlers. However, social hierarchy is not always based on elite control of agricultural land or other exploitable resources. In the Valle de La Plata, Colombia, a regional pattern research showed no correlation between settlement concentrations and access to particularly fertile land (Drennan and Quattrin, 1995). In this case, clear differences in social status are not accompanied by differences in wealth as expressed in control over agricultural land.

Aspiring elites might sponsor, or engage in, craft specialization as a strategy to accumulate wealth and/or control its distribution (Brumfiel and Earle 1987, Earle 1987). Control over the production and/or distribution of highly demanded items, such as obsidian or other lithic material, can provide the economic basis for social differentiation and political centralization (Hirth 1984, Shafer and Hester 1983, 1986). The site of Colha, a major center for the production and distribution of chert artifacts in northern Belize (Shafer and Hester 1983:538), is a classic example of the relation between specialized local production, regional export of utilitarian items and the development of political centralization and social hierarchies. Despite some disagreements regarding the amount of production at the site (Mallory 1986), there is unambiguous evidence of high levels of standardized lithic production during the Late Preclassic at Colha (Shafer and Hester 1986). Alternately, households on poor agricultural land might engage in specialized activities to compensate for low levels of agricultural production (Service 1968, Rice 1981), in which case craft specialization and distribution of manufactured goods is not necessarily centralized or subject to elite control.

Redistribution of goods through gift-giving, feasting, and non-economic or ceremonial exchanges (i.e the kula system) has been described as some of the main means by which aspiring leaders gain prestige (Fried 1967, Sahlins 1963, Service, 1968). Manipulation of symbols of prestige, restricted access to privileged knowledge and interaction in certain exchange networks are aspects linked to prestige-based strategies used by aspiring leaders (Helms 1979, 1994, Clark and Blake 1994, Spencer 1994). In particular, the role of interaction among elites, through the exchange of prestige goods and/or sharing a common ¨elite etiquette¨ (Schortman et al., 1986, Ashmore 1987:29, Brumfiel and Earle 1987, Peebles and Black 1987, Schortman and Urban 1992), has been seen as a strategy used by emerging elites to strengthen their position.

Taking into account the considerable variability found in the types and extent of achieved leadership in autonomous village societies, Spencer (1994) asserts that in order to prosper a leader has to establish relationships in two social dimensions: an internal one, between the individual and the community; and an external dimension in which the leader acts as ¨cultural broker¨ in relations with other communities. Following Werner, Spencer (1994:32-34) explains how aspiring leaders make use of generosity to recruit and maintain followers. For that purpose, the gifts considered most valuable are those with extra-village origins. Moreover, despite the leaders' ability to obtain goods from other villages or regions due to the burden of generosity they do not accumulate individual wealth (Spencer 1994:32, Strathern 1969). What is gained through gift giving and ceremonial exchanges is prestige.

Helms´ (1979, 1988, 1992, 1994) work sheds light on the non-economic dimension of long-distance exchange; the prestige and political power linked to people who associate themselves with a geographical distant place. Helms (1979, 1988, 1992) maintains that there is a widespread association of geographical distance with supernatural distance. People who have access to the distant are associated with the esoteric real. Helms (1979:69-70) relates the ¨successful operation of rank societies¨ with the ¨ability of the elite, especially chiefs, to generate and sustain the belief that they can control all facets of life, including people, natural resources, and the supernatural.¨ Association with the distant or foreign can be used as an element of social control since it affirms people's ability to wield esoteric knowledge effectively (Helms 1979:176).

1.4 Evidence from Regional Social Trajectories

Evidence derived from the analysis of different social trajectories in regions of west- central (Baudez and Becquelin 1973, Henderson et al., 1979, Healy 1984a, 1992, Benyo and Melchionne 1987, Schortman and Urban 1987, Hirth 1988, Dixon 1989, Hirth, Lara and Hasemann 1989, Hasemann 1987, 2000), and northeastern Honduras (Healy 1978, 1984a, 1984b, 1992), as well as from north-central regions of Nicaragua (Espinoza et al., 1996, Salgado 1996) points to common factors that stand out as key elements that can be used to explain the development of social hierarchies in those regions. For instance, access to prime agricultural land and permanent water sources seem to have been crucial factors in determining settlement location; moreover, early in the sequences of those regions, sedentism is followed by the creation or participation in already existing interregional exchange networks that mobilized both utilitarian and luxury items, such as obsidian, jade, and pottery.

In each region intricate connections between environmental, economic and sociopolitical factors came into play before or at the same time as the emergence of hierarchical social systems. In light of this information and building on scholarship regarding the bases of political leadership and subsequent social differentiation, factors such as access to agricultural land, craft specialization, local and interregional exchange are considered informative to investigate the presence and functioning of economic and prestige based strategies in the Jamastrán Valley.

Access to Prime Agricultural Land

The distribution of large nucleated settlements in western, central and eastern Honduras was concentrated in the broad and fertile intramontane basins or along the river bottoms of the extensive drainage system that flow north and eastward through the Atlantic watershed of Honduras. For instance, in the Comayagua Valley, Dixon (1989:258) notices that all main mounded sites are located along major waterways, on the valley floor. He also points out that the selection of Yarumela's location appears to be owed to its proximity to one of the largest expanses of foodplain within the valley (Dixon 1989). Yarumela would become the center of a primate settlement system in the valley by 400BC. A similar ¨nonintensive riverine subsistence pattern¨ (Healy 1992:99) is observed in the Lower Sulaco Valley region (Hirth 1984, Hasemann 1987, 1998).

Hasemann (1998) argues that in the Lower Sulaco Valley, sites clustered near the area of original colonization, the primary agriculture zone, where the main regional center eventually developed. As population continued to grow, competition over agricultural land intensified favoring the survival and growth of regional centers that would ultimately absorb smaller settlements. According to Hasemann (1998), struggle for agricultural resources can be recognized over time in the spatial distribution of sites in the Lower Sulaco by the uniform segregation of competing populations. Therefore, Hasemann (1989) concludes, the distribution of settlements in the Lower Sulaco River Valley, and the emergence of the paramount center where it did, was a direct function of the distribution of fertile soils in the region. A similar settlement distribution has been described for Las Segovias region in Nicaragua (Espinoza et al., 1996:42), where sites are generally located on alluvial plains close to rivers, with the larger plains occupied by the largest settlements.

In prehispanic Honduras, known agricultural populations appear to be located mostly in areas with prime agricultural land and near other productive resources. Los Naranjos, an impressive site complex in the Lake Yojoa region, is located close to both prime agricultural land and the largest lake in Honduras. Similarly, most known sites in northeastern Honduras are located on/close to rich alluvial soils in the Aguán Valley and the lagoon-stuary zone (Healy 1978).

Despite the overall high correlation between political hierarchization and access to prime agricultural land, evidence from the Sula Valley in northwest Honduras indicates that the mechanisms determining settlement distribution and development of complex social organization may have been responding to other factors, or in addition to, soil economics (Pope 1987, Hasemann 1998). Pope (1987) found no clear preference for settling on the most agriculturally productive soils during the Late Formative (400 BC-150 AD) and Late Classic (600-950 AD) periods in the Sula Valley, while different episodes of social complexity took place.

Craft production and Local Exchange

Aspiring elite strategies also entail dominating the production, mobilization, and use of particular valuables. Control over the production of highly demanded goods can also be achieved through limiting access to sources of raw materials or directing some steps in the production process. This kind of strategy typically results in differential wealth accumulation and/or differential participation in exchange and local craft production (Brumfiel and Earle 1987).

In the Naco Valley, in northwest Honduras, Schortman and Urban (1993, 1994,) have found evidence of craft production associated with figurines, whistles and ocarinas, stamps (stamps and stamps molds), ceramic vessels (sherd disks, smoothing stones), textile manufacture (spindle whorls),woodworking (drills, *hachas* or celts), and shell working (shell remains and specialized tools). The Naco Valley saw the emergence of central political occupation during the Late Classic (600-950 AD) when the site of La Sierra became the primate center of the valley (Schortman et al. 1992). Within the site core of La Sierra, researchers have found evidence that suggests significant elite control and centralization of craft production, as indicated by the presence of at least two kilns and several structures in the site core containing evidence of craft specialization (Schortman and Urban 1994). Elites at la Sierra appear to have obtained a monopoly over the production of some ceramic containers and marine shell working (Schortman and Urban 1994:410).

Mobilization (the transfer of goods from producers to political elites) is thought to be ¨at the heart of political development, ¨ enabling elites to become supporters of certain craft activities and sponsors of long-distance trade (Brumfiel and Earle 1987:3). In the Lower Sulaco Valley, the Early Sulaco phase (400-600 AD) sees the development of Salitrón Viejo as the primate site of the region. This period also marks the appearance of the Sulaco Ceramic Group which was widely distributed during the Classic period, suggesting contact with areas of eastern Honduras (Hirth et al., 1989:229) and Nicaragua (Salgado 1996) where Sulaco ceramics have been reported with frequency. The recovery of kiln wasters suggests that some Sulaco Group ceramics were locally manufactured and incorporated into a network of interregional exchange. In fact, during the Early Sulaco phase, the region appears to be involved in intensive long distance exchange networks. Trade goods recovered at Salitrón Viejo include a variety of exotic jade, marble, shell, and slate artifacts (Hirth et al., 1989:231). Albeit this evidence, the precise link between elite control of local craft production, and/or sponsorship of long distance trade, and the dynamics of social hierarchization in the region remains to be explained.

Interregional Interaction

The wide use and distribution of raw materials and finished luxury items in prehispanic Honduras has stimulated the academic interest in aspects of interregional commercial networks and intraregional sociopolitical organization. In central and western Honduras, the reconstruction of exchange networks has been supported by natural features in the landscape (Dixon 1989, Hasemann 1998, Hasemann and Lara Pinto 1993). Natural corridors have been interpreted as routes of incursion or exchange between populations and resources. Ancient settlements distributed along these corridors, which follow at least in part the alluvial bottoms of the extensive stream systems that traverse most of Honduras, show similarities in settlement forms, sequences of occupation and development, forms and decorative techniques of portable artifacts, levels of architectural scale, use of imported raw materials, etc (Hasemann 1998:67). Exploring the nature and operation of this interregional interaction has been one of the main research objectives in west central Honduras (e.g., Baudez 1973, Henderson 1977, 1978, 1988, Wonderly 1981, Joyce 1985, 1986, 1991, Schortman et al. 1986, Ashmore 1987, Schortman and Urban 1987; Dixon 1989, Schortman and Urban 1991, Hirth 1992).

In Santa Barbara, western Honduras, evidence suggests that different valley pockets of the region took divergent developmental trajectories in response to varying regional and interregional stimuli. On one hand, the site of Gualjoquito is located at the nexus of several potentially important communication/trade routes, but lacks enough arable land for agriculture. During the Late Preclassic (*circa* 400 BC) Gualjoquito was a village-based egalitarian society, ¨under the control of a developing elite power¨; however, by the Early Classic (200-600 AD) the site became the paramount center in the region (Schortman et.al 1986:269). Schortman et.al (1986:268) have hypothesized that as Gualjoquito's elite began to develop, they increased pre-existing ties with Copán and Los Naranjos, stressing the connection with the former.

Gualjoquito's strategic location gave its residents an advantageous position for the control of interregional communication and trade (Schortman et al 1986:269, Schortman and Urban 1987). Access to such exchange routes enabled elites to obtain imported goods, ¨borrow¨ models of ritual expression, architectonic elements, and other elite-controlled spheres that could have been used by the local elites to enhance their intraregional position and ¨status-reinforcement needs, ¨ as well as their ability to control and mobilize labor for private and public constructions (Schortman et al 1986:268,272, Ashmore 1987). On the other hand, the Tencoa pocket, where the Baide site developed, possessed an advantage in terms of land availability but its location was less favorable than Gualjoquito's. While Gualjoquito experienced an increased in wealth and regional power, the neighboring Baide site remained marginal in terms of intraregional localization of power during the Late Classic (Schortman et.al 1986:269, Benyo and Melchionne 1987).

In Eastern Honduras, Begley (1999) explored the role of interregional interaction in the development of social complexity in the Olancho region. Research in this area suggests that a long-distance relationship of a non-economic nature (non-commodity based) appears to have played a pivotal part in the sociopolitical organization of the region, given that the establishment of this type of relationship coincides with the first evidence of complexity in eastern Honduras by 500-600 AD (Begley 1999:58). According to Begley (1999), the adoption of ballcourts and related rituals by the emerging elites in eastern Honduras corresponds to a power acquisition strategy utilized to reinforce their local authority through their affiliation with powerful elites to the west. In both eastern and northeastern Honduras no great amount of commodities was mobilized through interregional exchanges with west central Honduras (Healy 1992, Begley 1999). It is possible than in northeastern Honduras, as in Olancho, interregional commodity exchange with societies in west central Honduras was not a determinant factor in the development of sociopolitical complexity. In fact, for Healy (1984, 1992:102) the period of greatest political and social complexity in the northeast occurs by 1000 AD, when ¨northeast Honduras, increasingly isolated from the western chiefdoms, instead commenced contacts with Lower Central American groups¨ at a time when most regions in ancient Honduras are going through processes of political decentralization.

1.5 The Jamastrán Valley

The highly irregular and varied surface configuration of Honduras is largely the result of recent mountain building within one of the most active tectonic regions on earth (West 1964). The continental surface of the country is grooved with long, east-west, trending interrange depressions, such as the Aguán, Sico, Patuca and Coco River valleys as well as a number of major, permanently irrigated basins (the Comayagua, Otoro, Olancho, Quimistán, Naco, Agalta and Jamastrán valleys). The Jamastrán Valley lies in the highlands of southeastern Honduras. It is one of several broad valleys scattered throughout the interior rugged mountains of the country and covers approximately 260 km^2, with a range of elevation from 400 mmsl to 600 mmsl on the valley floor and up to 900-1200 mmsl in the upland.

The Jamastrán Valley is watered by the Guayambre Drainage, which is formed by the El Hato and San Francisco Rivers flowing northward, and the Los Almendros River flowing southward. The Guayambre River joins the Guayape, forming the Patuca River, the second longest river in the country, which crosses eastern Honduras connecting the Jamastrán Valley with the Olancho and La Mosquitia regions. To the east, the valley neighbors part of north-central Nicaragua. The Jamastrán Valley presents a relatively high degree of diversity in terms of soil composition (SAG: 2003). Twelve different soil units have been identified in the valley, but these can be broadly classified as alluvial and colluvial. Alluvial soils form terraces (low, medium and high) along the main rivers that transverse the Jamastrán Valley whereas colluvial soils are found in the piedmonts.

Colluvial soils are poor and considered marginal for agricultural production, in contrast to the richer alluvial soils, which can be further divided into three different categories based on soil texture, drainage, mineral composition, pH levels, slope, and risk of flooding (SAG: 2003). Alluvial soils, then, are categorized as having high, moderate and limited productivity/fertility. Although fertile, arable land availability does not seem to be a limiting factor in the valley, there are some environmental risks that should be considered when examining decisions regarding prehispanic site location. For instance, risk of flooding is an important element to take into account given that some potentially fertile areas may be subject to that particular hazard during the rainy season. On the other hand, the six-month dry season can cause drought-like conditions that could lead to crop failure.

In most regions of Honduras access to fertile, arable land and permanent water sources were important factors in determining settlement location; moreover, many of the sites that became main political centers in their regions were located on very productive environments. It was reasonable to assume that the well irrigated and fertile bottomlands of the Jamastrán Valley most likely formed the critical subsistence base for permanent human occupation during prehispanic times. Due to the high attractiveness of the Jamastrán Valley regarding favorable settlement locations, it was assumed that the valley was in fact occupied in the past by agriculturalist communities that might have developed ranked social organizations. This research aims to explore not only the factors that affected the choice of settlement location and distribution but also the repercussions of those choices in the development of particular kinds of social interactions.

The presence of the Güinope source close to the Jamastrán Valley provides the opportunity of exploring the role of obsidian craft production and/or local exchange in the development of social hierarchies in the region. Obsidian from Güinope has been found in the Lower Sulaco Valley (Hirth 1987, Hirth, Lara and Hasemann 1989), Northeast Honduras (Healy 1984, 1992), the Las Segovias and Granada regions in Nicaragua (Salgado 1996). In the Lower Sulaco Valley and, probably, Northeast Honduras the amount of obsidian imported was rather marginal. However, in north-central Nicaragua and the Granada areas, the eastern Honduras source appears to have been more commonly used (Sheets et al., 1990). In Granada, during the

Bagaces Period (300-600 AD), Salgado (1996) suggests that the emergent elites at the Ayala site reinforced their position by controlling trade networks, particularly the exchange of imported goods, including pottery from central Honduras and obsidian from Güinope. In north-central Nicaragua, the ample distribution of Usulután and Sulaco Group-related ceramics and the high amounts of obsidian from Güinope shows a very close connection with central and southeastern Honduras.

The effects of the interaction between west-central regions of Honduras and Nicaragua in the local dynamics of southeastern Honduras and the position of the region in those macro-regional exchanges are some of the several issues that can be explored in the Jamastrán Valley. Its location made the valley a good candidate to study aspects of interregional interaction with groups from both Mesoamerica and Lower Central America. Within the framework of contrasting political strategies used by aspiring leaders to obtain social leverage, this research aims to identify whether the engagement of emerging local leaders in exchanges with counterparts from other regions had a role in the development of social hierarchies in Jamastrán.

Historical sources about the Jamastrán Valley *per se* are almost non existent. Some sources indicate that the Matagalpas, speakers of a ¨misumalpense¨ stock, settled Pacific Nicaragua before the arrival of the Chorotega and Nicarao presumably after 800 AD (Constenla 1991, 1994, Lehmann 1910). Matagalpa toponimies are present in northern Pacific Nicaragua (Salgado 1996) as well as in the El Paraíso department in southeastern Honduras where the Jamastrán Valley is located. At contact, the Matagalpa occupied present day departments of Chontales, Baoco, Matagalpa, Jinotega, Estelí, the southwestern section of Nueva Segovia, and the region of Honduras neighboring the latter (Ibarra 1994:195). According to the chronicles, the Matagalpa were organized as chiefdoms, and reportedly fought and traded with the Nicarao (Ibarra 1994:236). Whether or not the Matagalpas occupied the Jamastrán Valley is unknown; however, what the historical documents indicate is that regions of modern Honduras and Nicaragua were not isolated from each other during prehispanic and colonial times.

1.6 Research Questions

A regional survey was conducted in order to identify different processes of social organization in the Jamastrán Valley. It was assumed that if social organization in Jamastrán was non-egalitarian, the site hierarchies indicative of social differentiation would be recognized in the regional survey. Moreover, chiefly organization would be identified in the survey through the presence of compact large settlements, which might be chiefly centers, or by areas of particularly concentrated occupation around a focal place. Although the regional survey identified differences in settlement sizes, presence of architectural remains at two settlements, and areas with various degrees of nucleation, no undisputable central place dominates the landscape neither population concentrated heavily around such focal points. Within this context of truly embryonic social hierarchies, a useful approach to characterize social organization is to look at its integrative units and at the political means or social practices (forms of leadership) by which these units might be organized and integrated.

Populations interact at different integrative scales and into a variety of different social units; households, neighborhoods, settlements (villages or communities), clusters of settlements, and so on. It has been noticed that in developing hierarchical societies there are overarching sets of structures that enable autonomous local communities to establish close ties with other communities, creating a wider network of social relations (Service 1960, Sahlins 1968). Although these supra-village ties between communities constitute the "essence" of emergent hierarchical societies, the building blocks, from which such societies are built, are the local villages (Sahlins 1968:14-15). The notion that local villages or communities represent the building blocks of larger social interaction seems intuitive; however, the great diversity of social forms of organization found in the archaeological record indicates that the existence of communities should not be assumed but verified empirically (Peterson and Drennan 2005).

This research attempts to identify the integrative units or ¨building blocks¨ present among the sedentary societies of the Jamastrán Valley, through the study of population distribution across the valley. Second, to assess the degree of integration or autonomy of the region by determining the size, scale and patterns of settlement organization of the integrative units that make up the social system under study. Third, to explore the nature of the social interactions among those units as expressed by the presence of different leadership strategies indicated by differential access to prime agricultural land, involvement in craft production and exchange, and interregional interaction.

In order to study social organization in the Jamastrán Valley, this research will determine the scale and degree of integration of the settlements identified trough the regional survey. It will tackle the relation between integrative units (settlements and clusters of settlements, for instance), their interactions and the presence of particular forms of leadership strategies, namely economic-based and prestige-based strategies. This case study will help us explore under what circumstances some leadership strategies or combination of them are more or less successful in prompting social changes. It will also enrich the discussion about what constitutes the bases of social hierarchies in developing complex societies by considering whether some leadership strategies are more appropriate than others for particular kinds of sociopolitical integration and complexity.

2. Methodology

The Jamastrán Valley lies in Southeastern Honduras in the Department of El Paraíso (Figure 2.1). We conducted a full-coverage systematic regional survey of an area of approximately 250 km^2 that corresponds roughly to the natural topographic boundaries of the Jamastrán Valley. The survey covered all the ground in the area excepting the slopes too steep to walk. Most of the surveyed area consisted of cultivated plots and pasture lands, and surface visibility was optimal even during the rainy season. However, in areas where dense vegetation or soil conditions lower surface visibility, 40 cm x 40 cm x 40 cm shovel probes were used at intervals of approximately .5 ha. All of our shovel probes were negative, so our research relies solely on surface collections.

Two survey teams walking in transects, 25 m apart, inspected assigned areas in order to identify evidence of human occupation throughout the landscape (Figure 2.2). Each team composed of four people surveyed an area of approximately 1 km^2 a day. Each team recorded cultural features on topographic maps, filled field forms, and collected surface material. Sites were identified by the presence of artifact scatters; two settlements also present earthen mounds. The ground surface was carefully examined in order to establish the extent of the artifact concentrations. The entire extent of the artifact concentrations is called the collection unit. A collection unit had a maximum of .5 ha. Therefore, if artifacts were scattered over an area of 1 ha, this area would be divided into two .5 ha collection units and a sample would be taken for each one. Conversely, if the artifact concentration was less than .5 ha, only one sample was taken.

Most of our surface collections are systematic; however, we also recovered material from 47 spot findings. Besides these spot findings, which were not incorporated into the final analysis, we only recovered archaeological material from systematic surface collections, given that surface densities were greater than 1 artifact/m^2. To standardize artifact-density values, artifacts were collected in circles of 3 m diameter (7.065 m^2) and assigned to lots (collection units) of .5 ha. On average, we collected 23 sherds for each collection unit. After collecting our samples, the boundaries of each collection unit were drawn in field maps (sections of topographic maps printed at a 1:10,000 scale). The settlement maps produced reflect then the extent of human occupation in the region expressed through the material remains collected on the surface.

A total of 144 systematic collection units were recorded during the survey. In those systematic collections, ceramics and obsidian were the most common materials; although other lithic artifacts were recovered. 114 collection units yielded information that allowed chronological placement; only these collections were incorporated in our analysis. Relative dates were obtained by comparing the ceramic material from the Jamastrán Valley to diagnostic ceramic types from other regions where chronologies have been already established. Ceramics were classified according to the type-variety system, and following the criteria of the already known ceramic groups. Lithics were classified according to raw material, production technique, and form.

2.1 Ceramic Analysis and Regional Chronology

Artifacts were counted, washed and classified every day after returning from the field. Further ceramic analysis continued once all the material recovered during the survey was transported to IHAH´s (Instituto Hondureño de Antropologia e Historia) main deposit in Tegucigalpa. It was carried out at IHAH´s laboratory where we had access to ceramic collections from other areas of the country, which was useful in terms of comparing the Jamastrán material to known ceramic types from other regions. So, in order to identify the ceramics and obtain relative dates for our collection units, the artifacts recovered in the Jamastrán Valley were compared to well-established chronologies for different regions. Particular attention was taken to typologies developed for eastern Honduras ceramics (Véliz 1966, 1978, Healy 1993, Viel and Begley 1992, Beaudry-Corbett 1995). Our analysis followed the standard type-variety-mode system widely used for studying ceramics in Honduras (Henderson and Beaudry-Corbett 1993). The laboratory analysis confirmed what we had observed during fieldwork; that is, a significant proportion (28%) of the ceramics recovered from Jamastrán are part of the, relatively, recently identified Chichicaste Polychromes. We compared our samples to the collections analyzed by Beaudry-Corbett (1995) and used her classification as the basis for our own regarding the Chichicaste material. Beaudry-Corbett (1995) has identified four different groups comprising the Chichicaste Polychromes: Lineal; Zoned, Painted and Incised; Rojo Granate (Bichrome and Trichome); and Geometric Group. Based on surface treatment, forms and paste attributes we identified the Rojo Granate and Geometric groups from our sample (Figure 2.3, Figure 2.4). Due to the presence of highly eroded sherds in most cases we had to rely on the identification of forms to achieve a classification.

The characteristics of the identified Chichicaste groups in the Jamastrán Valley followed (Beaudry-Corbett 1995, Beaudry-Corbett et al. 1997):

Rojo Granate (Bichrome and Trichrome)

Shape with supports: Shallow bowls

Shapes without supports: bowls (slightly incurved to very restricted rims), globular jars (high straight neck)

Supports: hollow-large conical

Designs: simple and more complex geometric motifs, representational motifs (birds and bats), complex geometric designs on interior bases.

Technique: orange and dark red paint on orange slip, use of red dots on the outside of ondulating orange band, rectilinear red design with infilling of orange.

Stylistic comparison: This group seems to represent a stylistic tradition that extends from Western Honduras (Cancique Bichrome and Polychrome), Nicaragua (Caucalí Rojo Sobre Naranja) and El Salvador (Machacal Purple Painted).

Geometric Group

Shapes: all those represented in the Rojo Granate Group with the exception of dishes without support.

Decoration: representation of both geometric and representational motifs.

Stylistic comparison: Sulaco Group (distributed across the lower Ulúa Valley, Comayagua, Lake Yojoa and the Sulaco-El Cajón region).

The Chichicaste Geometric Group has been classified as part of the Sulaco Ceramic Group. The Sulaco Group (previously known as Bold Geometric) along with the Ulúa Polychromes are two of the better known ceramic traditions of central Honduras, beginning at around 400-600 AD. This is a period of intensified interregional interaction throughout Honduras and especially among communities in central and western Honduras. Between 600 and about 1000 AD, Sulaco and Ulúa Polychromes became even more widespread commodities. Although Sulaco Group ¨equivalents¨, including the Chichicaste Group (Figure 2.5), have been identified throughout Honduras, different lines of evidence had led researchers to indicate that this is a local ceramic tradition (Beaudry-Corbett 1995). Beaudry-Corbett (1995, 1997) has amply described the fundamental differences among the Sulaco and Chichicaste Groups in terms of composition, ¨design program¨ and repertoire of shapes. The Chichicaste collection analyzed by Beaudry-Corbett suggests that the polychromes share formal characteristics, such as decorative motifs and use of pictorial space, with ceramic traditions from neighboring regions in the south and north; however, Chichicaste is a locally developed tradition that ¨accepted influences from foreign cultures and adapted these representational forms according to its own requirements¨ (Beaudry-Corbett et al. 1997: 58).

Chichicaste Polychromes have been recovered from the Talgua Village, in the Olancho Valley, in eastern Honduras. The Talgua Village seems to have had a single period of occupation dated to the Late Classic Period based on ceramic stylistic analysis. Radiocarbon dating confirms the chronological placement, providing a calibrated radiocarbon date of 780-885 AD. In the Culmí Valley, Olancho region of eastern Honduras, Begley (1999) reported the presence of highly eroded sherds with a ¨chalky¨ paste texture. Chalky paste is similar to eroded ceramics from the Chichicaste Polychromes (Gómez personal communication in Begley 1999:127). The softness of the paste indicates that the vessels must have been painted or slipped. According to Begley (1999:154), ¨chalky¨ sherds are so ¨similar throughout their range (from the Aguan Valley near Trujillo, to Chichicaste, to the Culmí Valley) that a smaller area of manufacture may be suggested.¨ Comparison of different episodes of sherd erosion of Chichicaste collections from eastern Honduras and Jamastrán vis a vis identifiable Chichicaste shapes (specifically supports) led us to confirm the identification of ¨chalky¨ sherds as part of the Rojo Granate and Geometric Groups.

In Northern Nicaragua, Sulaco Group ¨equivalents¨ have been identified as Caucalí Rojo sobre Naranja and Las Tapias Tricomo; however, it is likely that these types might be part of the Chichicaste Polychromes. This statement is based on photographic analysis and description of paste (Espinoza et al. 1996:91-93), so, further analysis of theses ceramic types is necessary to confirm this suggestion. The identification of Chichicaste Polychromes would allow us to re-examine interregional interactions between central and eastern Honduras and also the relationship among communities in eastern Honduras and northern Nicaragua. Both Caucalí Rojo and Las Tapias Tricomo have been recovered in excavations in Las Segovias region and dated to about 600-800 AD. There is no evidence of actual, local, ceramic production of those ceramic types in northern Nicaragua according to known publications about the region (Espinoza et al. 1996).

Our survey in the Jamastrán Valley also recovered ceramics with punctuated and incised motifs (.7% of the sample). Punctuated and incised ceramic types recovered in the Valley are similar to types recovered in northern Nicaragua and other areas of ancient Honduras; especially to Guiguilisca Inciso, which shares stylistic similarities to Masica Inciso. In northern Nicaragua Guiguilisca Inciso is dated to the Casa Blanca Phase (600-800 AD), and Masica Inciso in the El Cajón region has been dated to the Middle Sulaco Phase (600-800 AD).

Another important ceramic marker recovered in the Jamastrán Valley is the Ulúa Polychome (Beaudry-Corbett and Henderson 1993, Joyce 1993). We recovered 7 sherds belonging to the Red Group of the Ulúa Valley Polychormes. The Red Group was first produced in the Ulúa Valley around 500-600 AD. Evidence from the Culmí Valley in eastern Honduras and the Las Segovias region indicates that this type of ceramics are recovered from contexts dating to around 600-800 AD (Begley 1999, Espinoza et al. 1996).

Based on the presence of Chichicaste Polychromes in different areas of eastern Honduras (Beaudry-Corbett 1995, Beaudry-Corbett et al. 1997, Begley 1999, Winemiller and Winemiller Ochoa 2009), as well ceramic evidence from northern Nicaragua (Espinoza et al. 1996) and the chronological placement of Ulúa Polychomes in those areas, in relation to the ceramic material found in the Jamastrán Valley, we estimate that the occupation of Jamastrán took place between 600-1000 AD. This relatively late, and short, occupation of the Jamastrán Valley parallels the history of occupation observed in the Culmí Valley and the Talgua Drainage (Begley 1999, Beaudry-Corbett 1995) as well as in the Las Segovias Region in northern Nicaragua (Espinoza et al. 1996).

Our ceramic evidence thus allows us to present information about 400 years of sedentary occupation in the Jamastrán Valley. It is important to note that no evidence was found of any occupation in the Jamastrán Valley prior to about 600 AD. This was a considerable surprise since a number of other regions in Honduras had sedentary farming populations at a considerably earlier date. Likewise, there was no evidence of occupation in the Jamastrán Valley after about 1000 AD—also a surprise. The analysis in the chapters that follow, then, is fundamentally synchronic. It concerns the occupation of the Jamastrán Valley between about 600 and 1000 AD, a single period which ceramic analysis does not, at present, enable us to subdivide. It does, perhaps, make sense that the Jamastrán Valley, lying less than 100 km southeast of highly developed large Classic Maya centers, shows a population peak contemporaneous with the Late Classic population peak of the Maya lowlands. That its population before and after this period was so small as to be entirely undetectable in systematic survey, however, is curious. We will return to this issue in the final chapter, following analysis of the distribution of settlement during the period when the Jamastrán Valley was occupied.

2.2 Lithic Analysis

Lithic analysis was carried out at IHAH´s laboratory in Tegucigalpa. We recovered and analyzed 645 flake stone tools; 34 made of chert and 611 of obsidian. Obsidian sourcing was done through visual examination following Aoyama´s (1999) description of obsidian from different sources commonly found in the archaeological record of Honduras. Our material was also compared to a comprehensive obsidian sample located at the IHAH´s laboratory.

2.3 Density–Area Index (DAI)

Population estimates for the Jamastrán Valley were established using a demographic index that combines occupied area and quantity of material remains as the basic variables. The combination of these two separate categories (area of each collection units and surface density of sherds collected for each unit) produces a relative demographic index which will be the basis for further population estimates and demographic analysis, following the approach developed by Drennan et al. (2003) to create a Density Area Index (DAI). Information about the exact area of each systematic collection unit along with the surface density of sherds collected in our 3 m diameter circles was combined to estimate DAI values for each collection unit from our survey. The DAI values (Table 2.1) were the basis for estimating population for the entire Jamastrán Valley for a period of 400 years of continuous occupation. The conversion of this relative demographic index into absolute population estimates is explained in Chapter 3.

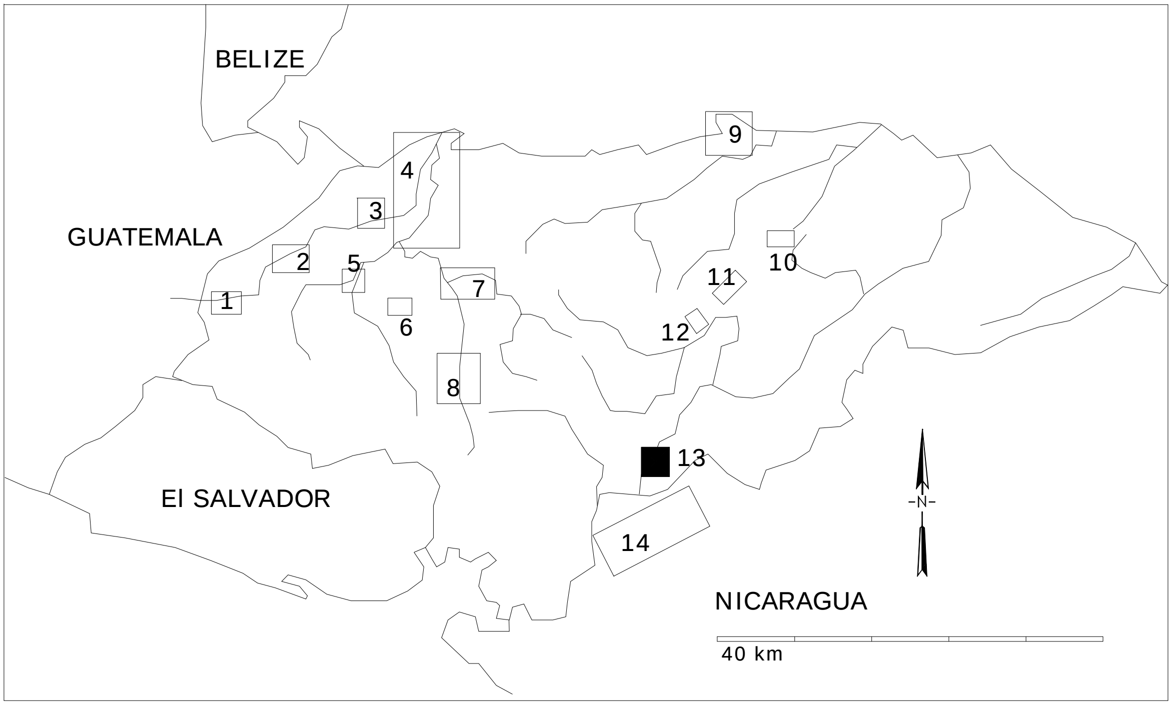

Figure 2.1 Jamastrán Valley and Neighboring Regions

1. Copán Valley
2. La Venta Valley
3. Naco Valley
4. Ulúa Valley
5. Central Santa Bárbara
6. Lake Yojoa area
7. Sulaco Valley
8. Comayagua Valley
9. Northeastern Honduras (Aguán Valley)
10. Culmí Valley
11. Olancho Valley
12. Telica Valley
13. Jamastrán Valley
14. Las Segovias Region

Figure 2.2 Surveying in the Jamastrán Valley

Figure 2.3 Rojo Granate, Chichicaste Polychromes

Figure 2.4 Geometric Group, Chichicaste Polychromes

Figure 2.5 Chichicaste, Colección Erazo, IHAH

Collection Units	Collection Area	No. Sherds	Sherds/Century	DAI	DAI/Century
144	62 ha	3,259	815	219	55

Table 2.1 Number of Collection Units, Sherds, and DAI Values in the Jamastrán Valley Survey Area

3. Settlement Patterns and Demography

3.1 The Settlements of the Jamastrán Valley

The main evidence of ancient population presence in the Jamastrán Valley is based on artifactual remains such as lithics and ceramics. Ceramics are particularly useful indicators of past human activities since they represent a basic component of ancient garbage. The study of ancient garbage lies at the heart of archaeological research for their commonness sheds light on a wide range of economic, ritualistic and social interactions. Distributional and demographic patterns, as well, can be elucidated by quantifying the amount of garbage -ceramics- left by people on particular areas of the landscape.

Thus, settlement and demographic patterns in the Jamastrán Valley are approached by the analysis of the distribution of ceramics across the survey area as well as by their varying densities in different locations. A discussion of our treatment of ceramics in order to calculate densities is carried out in Chapter 2. Besides calculating sherd densities for each collection unit identified in the field, our analysis involved the spatial representation of those densities following the approach proposed by Peterson and Drennan (2005). Our results will be presented in this chapter.

A starting point for understanding demographic patterns in the Jamastrán Valley consists in analyzing the ceramic distribution across the survey area. Figure 3.1 shows the location and extent of 144 collection units included in this analysis. All collections contain ceramics that represent 400 years of ancient human occupation in Jamastrán. As indicated in Chapter 2, collection units have an average area of little less than half a hectare and covered a total area of about 62 has.

The number of collection units in the survey area is rather scanty. Most of them are located on high terraces along rivers, which indicate that closeness to permanent water sources might have been important to select a settlement location. It can also be observed the dispersed pattern of collection units across the survey area. It has been proposed that this kind of dispersed settlement pattern is often related to the labor demands of intensive agriculture. In order to maximize the labor efficiency of farming households and minimize the distance traveled daily to their fields; households will locate their residences adjacent to the lands they cultivate (Sanders 1981, Drennan 1988). The relationship of settlement location and agricultural production will be explored in Chapter 4.

Despite the general pattern of settlement dispersion, there is a tendency to form clusters of collection units. This is particularly noticeable in the northern part of the survey area, where the modern community of Calpules is located. Areas of occupation where clustering of collection units tend to occur are considerably separated from other such clusters. A finer assessment of settlement nucleation, spread of human occupation, and social interaction in the valley will be presented later in this chapter.

To continue exploring settlement and demographic patterns in the Jamastrán Valley we turn to the density of ceramic materials present in each collection unit. As described in Chapter 2, a Density Area Index (DAI) was calculated following the approach proposed by Drennan et al. (2003: 152-166). This index makes use of two separate categories: occupied area (area of each collection unit) and quantity of material remains (surface density of sherds collected for each unit). The combination of these two sets of information produces a demographic index which will be the basis for creating surface and contour maps that help us delineate clusters of collection units; in other words, to delineate settlements, and investigate the presence of local communities and/or other meaningful units of social interaction in the Jamastrán Valley.

3.2 Delimitation of Social Units

It is possible to delineate the clusters of settlement identified in the Jamastrán Valley using occupational surfaces based on area-density values that function as archaeological proxy measures of population densities. The methods of analysis carried out here followed the approach proposed by Drennan and Peterson in both separate and joined publications (Drennan et al. 2003, Peterson and Drennan 2005, Drennan and Peterson 2005a, Peterson 2006). Their application of distance-interaction principles to smoothed surfaces of occupational distributions allows the delineation of different social units.

Area-density values were calculated for each collection unit included in the analysis, and their corresponding values were associated with each digitized collection unit as an independent property of its elevation (z-value). These collection units and their elevation data were then rasterized into a grid of z-values at 100 m intervals (raster layer of ceramics densities at a resolution of 1 ha). Therefore, and also considering that our collection units have an average area of slightly less than half a hectare, more than one collection unit fell within each square 100 m cell in the grid. The values of each cell were mathematically transformed using an inverse distance square logarithm and the effect of this transformation is to ¨smooth¨ or ¨pull¨ the distribution of surface sherd densities. The distance-interaction effects of the logarithm can be summarized as follows: the greater mathematical power the z-values are raised to, the lesser the effects of distant values, and vice versa. Then, higher powers will produce less or no smoothing.

Powers 4, 2, 1.5,1, .50, and 0.25 (Figure 3.2) were used in this analysis to produce surface maps or ¨occupation¨ surfaces. So, varying levels of ceramic densities were mapped as they distribute themselves according to each power applied to the dataset. Comparison of these different surfaces along with their corresponding contour maps provided the basis for grouping clusters of collection units into larger inclusive clusters. The formation of such clusters reflects a pattern of closer interaction within them than with other inclusive groupings. Since the clustering of collection units come to reflect clustering of population, the surface maps analyzed here indicate the presence and distribution of spatially-discrete occupation units or settlements (different kinds of social units). Two of these surfaces, the power 4 and power .5 surfaces will be discussed below.

The power 4 surface (Figure 3.3) shows a series of peaks that represent higher areas of sherd densities whereas flat areas represent areas of the survey area where ceramics were not recovered. Naturally, higher peaks represent higher sherd densities. The peaks shown in the surface map are sharply defined and separated from other peaks. A cutoff contour was established to outline the base of each peak. Following this procedure our 144 collection units were grouped into 15 clusters comprising several collection units, with the exception of two particularly dense single-collection units. These 15 settlements range in size from 1.61 has (130 meters across) to 38.62 has (1,020 m across). A distance of 1 linear kilometer (1,000 m) has been described as the upper threshold for daily face-to-face interaction in small local communities (Peterson and Drennan 2005:10). Thus, we believe that the contour level selected for cutoff is clustering collection units into actual meaningful groupings of social interaction; small local communities or villages and farmsteads.

Besides these 15 areas where collection units clustered, there are 34 isolated single collection units located across the landscape, particularly around larger settlements in the northern part of the Valley (the Calpules area). They represent 23.62% of the total collection units included in the analysis as opposed to 76.38% of collection units clustering within the 15 larger settlements. These 34 isolated settlements range in size from a little less than half a hectare to no more than 20 meters across. These small settlements might represent individual households and probably other kinds of occupation areas (for special activities and/or areas of sporadic use).

3.3 Population

3.3.1 Regional Population

The estimation of absolute population is normally approached by the examination of different lines of evidence, such as ethnohistorical accounts of the region under study or neighboring areas, counts of residential structures when these have been exposed by excavation, and crosscultural ethnographic studies of demography. The information provided by these sources can be combined with relative demographic indexes to approximate numbers of people. Although we encountered and mapped some mounds during our survey, none of these has been excavated, so reliable information about actual amount of structures is not available for the Jamastrán Valley at this point of research. As stated earlier, the distribution and quantification of garbage left by ancient inhabitants of the Jamastrán Valley is our best demographic evidence.

The DAI is a relative demographic index; that is, lower values indicate lower population and higher values indicate higher population. Although this index does not provide by itself absolute estimates of population, it is suitable for conversion into such estimates when multiplied by a figure approximating how many people will leave a density of ceramic remains averaging 1 sherd/m² over an area of 1 ha (Drennan et al., 2003:161). Therefore, in order to estimate regional population in the Jamastrán Valley we summed the DAI values for all collection units recorded and then multiplied this result by minimum and maximum estimates of the number of people required to produce a fixed surface sherd density across an area of 1 ha at a particular moment in time. Minimum and maximum estimates, approximations of absolute population, were calculated using as reference recent demographic analysis for the San Ramon de Alajuela valley in the western part of the Central Plateau of Costa Rica (Murillo 2009).

Seven settlements located in San Ramon de Alajuela and neighboring areas, with excavated residential structures, were included in Murillo´s population analysis (2009:63-72). Based on ethnohistorical accounts and calculation of house floor areas he estimated the number of inhabitants per square meter of roofed area and from there the number of people per hectare for each settlement analyzed. Murillo (2009) created a scale to compare population numbers derived from excavated settlements and population densities (sherd densities) from these settlements, and the ones he recorded in San Ramon. Murillo (2009: 69) explains that if we take the top surface sherd density of San Ramon (16 sherds/m²) to represent a residential density of around 100 people per hectare, then these numbers can be scaled proportionally for collection units with higher or lower ceramic surface densities. Based on this scale, a figure can be approximated by which each area-density value needs to be multiplied to obtain the equivalent number of inhabitants in 1 ha.

The San Ramon sherd densities presented in Murillo´s scale were compared with the Jamastrán sherd densities in order to find a corresponding residential density figure. The top surface sherd density of Jamastrán is 8.7 (sherds/m²). According to Murillo´s scale (2009:72) a sherd density of 8.2 would represent a residential density of about 52 people per ha. The minimum and maximum figures were also calculated based on the scale discussed here. To account for differences in sherd densities from Jamastrán and San Ramon, both minimum and maximum population figures calculated with Murillo´s scale were divided by the equivalent area-density value corresponding to 8.7 sherds/m² from our dataset. The resulting values are 7 and 15 people per ha. Therefore, a settlement with a DAI of 1 represents between 7 and 15 people. Based on this numeric relationship, the DAI of each collection unit or series of collection units that make up a settlement can be multiplied by 7 to produce a minimum population estimate and by 15 to produce a maximum population estimate. For instance, the collection unit with a density of 8.7 sherds/m² has an area-density value of 4.39, which equals to 31 and 66 people. Then, the average number of people for a sherd density of 8.7 is 48 people.

Applying the factors to the total population index for Jamastrán (DAI:219.29) yields a minimum population estimate for the entire surveyed area of 1,535 people, a maximum estimate of 3,289 and an average of 2,412 people at any given time in the ancient occupation of the valley, from 600-1000 AC. Population densities in the valley are of 6, 13, and 9 people per km² for minimum, maximum, and mean values respectively.

3.3.2 Local Population

The population of each settlement delimited through the surface and contour maps was calculated by multiplying the DAI values of each settlement (the sum of all DAI values for all collection units comprising each settlement) by the minimum and maximum population estimates. This makes it possible to estimate how many people lived in these settlements but also to determine whether a settlement might represent one or three families living together or ten or twelve families congregating close by. Each settlement was characterized as a given sociopolitical unit according to the population size it hosted. A household was defined as a social unit that comprises one or more families (4-12 people); a hamlet comprises between four and ten families (16-40 people); and a small village consists of more than twelve families (approximately more than 40- 45 people).

After estimating the population of the 15 higher ¨peaks¨ shown in the surface maps and that of the 34 isolated settlements that compose our data, it was clear that some of these isolated units represented sporadic occupation areas since they had population figures of 1 or less than 1 person. Nineteen (19) settlements with population figures of 1 or less than 1 person were eliminated from the demographic analysis. These settlements might represent the settling of families only during parts of the whole period of occupation in the valley. Table 3.1 shows the population estimates of 30 settlements that are considered permanently or continuously occupied as opposed to the 19 settlements occupied occasionally. So, permanent settlements in the Jamastrán Valley sum up 2,400 people (average number). The minimum and maximum population averages from the permanent settlements are 5 and 530 people, which reflect a wide range of population densities among settlements. It is worth noticing that the 15 settlements with higher population densities (the high peaks in the surface maps) comprise 92% of the total population in the valley. The other 8% of population is comprised within the 15 remaining smaller settlements.

Based on the population estimates for each settlement, they were classified into households, hamlets and villages. Table 3.2 shows the number of people that inhabited 12 villages, 11 hamlets and 7 households in the Jamastrán Valley. The 15 settlements with higher population densities identified with the surface maps comprised, on average, 2,137 people living in 12 villages, 56 people living in 2 hamlets, and 11 people living in 1 household. Whereas the 15 remaining, smaller, settlements represent 6 individual households comprising an average of 52 people, and 9 hamlets comprising 144 people.

In sum, an average of 2,137 people lived in villages, which hosted a minimum of 32 and a maximum of 530 people (both, and all calculations below, are average numbers), and account for 89% of the total population. An average of 200 people lived in hamlets that hosted a minimum of 13 and a maximum of 30 people, and represent 8% of the total population. Finally, an average of 63 people lived in individual households that range from a minimum of 5 and a maximum of 11 people, making up 3% of the entire population of the Jamastrán Valley.

3.4 Regional Integration

Rank-size graphs of the 15 larger settlements (92% of the total population) were elaborated to explore the level of sociopolitical integration in the Valley. Rank-size distribution of settlements in a settlement system has been used in archaeology to measure the relative integration of that particular system (Johnson 1977, 1980, 1981). A rank-size distribution is another way of looking at size-frequency distribution of settlements. A rank of sites is defined by their hierarchy of size (ranked in a descending manner), and settlement size is defined by population size. If a given rank of settlements and their sizes are plotted against, the resulting plot is a rank-size graph. Explanations of the rank-size rule and deviations from it have been discussed elsewhere (see Johnson 1980, 1981 and Drennan and Peterson 2004); suffice to remember here is that a log-normal pattern conforms exactly to the rank-size rule (a settlement of rank 2 is ¨expected¨ to be half as large as the rank 1 settlement; the rank 3 settlement to be one-third as large as the rank 1 settlement, and so on) and that two main departures from rank-size linearity have been noted: primate and convex. On one hand, primate distributions produce a rank-size graph with a concave curve dropping below the log-normal line. This pattern is produce by the presence of a significantly large settlement in the system. In Johnson´s words (1981:148-150), viewed from the perspective of the largest settlement, the other settlements in the system are smaller than the rank-size rule would predict. On the other hand, convex distributions produce a rank-size graph with a convex curve in relation to the log-normal line. This pattern is produce by the presence of several large settlements with similar populations. Viewed from the perspective of the larger settlement, the other settlements in the system are larger than the rank-size rule would predict.

To go beyond subjective characterizations of rank-size graphs (as primate, convex, primo-convex, or log-normal), Drennan and Peterson (2004) developed a mathematical coefficient for describing the shape of the rank-size curve, and for establishing levels of confidence. Their coefficient (A) measures the net tendency of a rank-size curve and provides a scale that indicates the strength of the departure of an observed pattern from log-normal. According to the scale, a very highly convex distribution (lack of settlement hierarchy) would have a value of 1.0, a log normal distribution would have a value of 0.0, and increasingly primate distributions would have increasingly negative values, where -1.00 indicates a pattern of extreme ¨primateness¨ (Drennan and Peterson 2004:534, see also Johnson 1980: 137-139 and Johnson 1981:154-155 for a discussion of a similar index). Moreover, the A coefficient provides the basis for assessing the probability that differences in rank-size patterns could be the result of nothing more than the vagaries of sampling. The basis of such assessment is accomplished by establishing an error range from the level of statistical confidence desired (Drennan and Peterson 2004:535).

Figure 3.4 shows a rank-size graph of the 15 larger settlements in the Jamastrán Valley. The rank-size curve is convex, with an associated A value of .173. This pattern indicates the presence of several larger settlements with similar populations; however, their population sizes are not as equal to create a stronger tendency of the convex curve. We selected a 90% confidence level error range to asses the probability that the pattern observed in the rank-size graph could be the result of the vagaries of sampling. So, we are 90% confident that our data represents a settlement dynamic different from that suggested for log-normal patterns.

A convex pattern suggests low political integration in the Jamastrán Valley. This pattern of population distribution coincides with what has been represented in the surface maps; that is, the absence of one central place that congregates high population densities in the region. Instead of one single village clustering a substantial amount of the regional population, there are some villages of rather similar sizes where population nucleate. The distribution and size of the population in the valley suggest a regional scenario in which most likely autonomous villages interacted at different levels of intensity.

3.5 Exploring Supra-Village Interactions

Surface maps produced with power .50 were examined more closely to explore the presence of interactions above the village level. As before, comparison of these different surfaces along with their corresponding contour maps provided the basis for grouping clusters of settlements into larger inclusive clusters. Again, the formation of such clusters reflects a pattern of closer interaction within them than with other inclusive groupings.

In contrast to the surface generated with power 4, the map shown in Figure 3.5 shows a smoother surface with a series of peaks which bases extend farther away. A cutoff contour was established to outline the bases of each peak. Following this procedure, five areas of higher population densities can be identified. Two of them (La Cañera and Santa Rosalia, on the western part of the valley) consist of two individual villages comprising mean figures of 273 and 114 people respectively (Table 3.3). The other three areas are located to the north (Calpules), to the east (Rancho Rosa) and middle part of the valley (El Zapotillo). Each of these three areas clusters more than one village and some households and/or hamlets. The Calpules area clustered three villages, three hamlets and thee households, comprising 28% of the population of the valley. The El Zapotillo area clustered three villages, one hamlet and one household, making up 30% of the population. The Rancho Rosa area clustered two villages comprising 15% of the population.

These clusters are taken to be discrete areas where communication and exchanges among villages and households were closer than with other similar interacting areas in the valley. Johnson (1980:240, 1981:150-151) points out that convex rank size distributions can be explained as resulting from settlement systems ¨pooling¨; that is, the combination of two or more autonomous or relatively autonomous settlement systems in the same analysis. In these cases, there are significant boundaries between or among settlement systems within an area under study. Following Johnson (1980, 1981) and considering that almost 60% of the total population of the Jamastrán Valley nucleated within two of the interacting areas in the valley (Table 3.4), it is worth exploring the level of integration within each regional cluster.

Figure 3.6 and Figure 3.7 show very primate patterns for both Calpules and El Zapotillo areas. (A=-.801, n=9 and A= -1.34, n= 5, respectively). Taking into account the small sample sizes, we selected an 80% confidence level error range to asses the probability that the pattern observed in the rank-size graph could be the result of the vagaries of sampling. So, we are at least 80% confident that our data represent a settlement dynamic different from that suggested for log-normal patterns. The patterns observed in the rank size graphs, of the whole region and within the regional clusters, support the idea that significant internal interactional boundaries were present in the Jamastrán Valley. So, we take the regional clusters identified in the surface and contour maps to represent interactional boundaries in the valley. These patterns, in fact, support the notion that more intensive interaction took place among the local communities within each regional cluster than with communities outside of it.

3.6 The ¨Building Blocks¨ of the Jamastrán Valley

This chapter dealt with the demographic aspects of social organization in the Jamastrán Valley. The first step for assessing social organization was to identify the presence and scale of the basic social units in the archaeological record of the society under study. It has been amply pointed out that individuals interact at a variety of levels and into a variety of different social units, creating a nested hierarchy of formalized entities of integration and interaction. Therefore, societies are composed of various integrative units of which the nuclear family is considered the basic social grouping and the genuinely universal one (Murdock 1949:3, Steward 1955:54). Supra-familial organization and its role as a building block of larger social interactions, however, should not be assumed but verified empirically given the diversity of forms of social organization found in the archaeological record (Peterson and Drennan 2005).

Our research in the Jamastrán Valley identified three main integrative social units interacting simultaneously in the region: households, small local communities (hamlets and villages) and settlement clusters. Households are composed of nuclear or extended families usually ranging from 4-12 people (Sanders 1977:329, Sanders 1984:12). Hamlets and villages correspond to the aggregation of several households into discrete spatially-delineated units forming communities of varying sizes. A community can be defined as the maximal group of persons who normally reside together in face-to-face association (Murdock et al. 1945:29 in Murdock 1949:79). The community at its lower limit may consists as few as 15 persons (Carneiro 2002:37), whereas the upper limit is apparently set by ¨the practical impossibility of establishing close contacts with developing habitual attitudes toward any great number of people¨ (Murdock 1949:81). Drennan and Peterson (2005:8) point out that a local community is formed when social interactions are intensely concentrated within a single well-defined group of households that interact only much less intensely with households outside the group (Figure 3.8).

Community organization is favored when activities requiring suprahousehold organization appear, for instance: productive processes may become patterned around collective hunting, fishing, herding, or faming (Steward 1955:54). It has been also noticed that the advantage of community organization resides on insurance against temporary incapacity or adversity though mutual aid and sharing (Murdock 1949:80). Property rights requiring interhousehold understandings are established under community organization. Social and economic relations may be reinforced through group ceremonialism, forms of extended kinship and friendship, and recreational activities at the community level (Steward 1955: 54).

The regional distribution of the population in the valley suggests that households and small local communities placed their residences close to the lands they cultivated in an effort to minimize travelling distances to their fields. Since occupation was rather spread throughout the entire survey area, social interaction of moderate intensity involving the entire population is implied among the small-scale agriculturalist communities in the Jamastrán Valley. Despite this pattern of dispersed regional distribution, population tended to nucleate mainly in two areas of the region under study. Regional settlement clusters in the valley measure as much of 3 and 4 km across, a spatial scale to large to involve face to face interaction on a daily basis but amenable to foster interactions that arise from occasional or less immediate demands of the small local communities. The presence of larger community structures above the level of the small local communities is taken to represent the existence of at least two autonomous systems in the Jamastrán Valley. Within the regional clusters population tended to concentrate in one local community, which hosted a significantly larger population than the other communities integrating the regional cluster (Tables 3.4 and 3.5, Figure 3.9).

The communities present in the Jamastrán Valley interacted at varying social and spatial scales; small local communities of those in face to face interaction on a daily basis nested within larger regional-scale communities. The small local communities identified in the study area are the building blocks upon which larger social structures are established. So, we have identified different integrative social units in the valley, some suggesting patterns of closer interaction than others. Whether direct (face to face) or indirect contact took place, it does not indicate the nature of the relationship between those in contact. Whether the interactions being foster in the small local communities of the valley are economic, ritualistic or purely social will be explored in the following chapters.

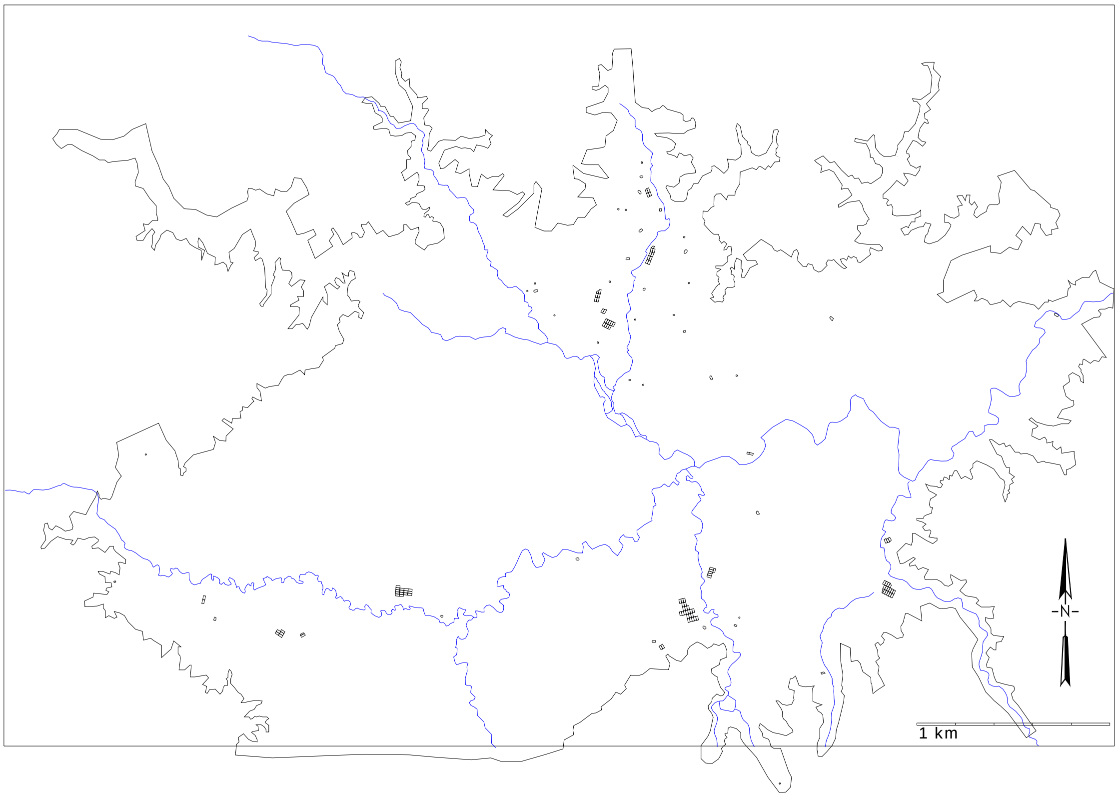

Figure 3.1 Distribution of 144 Collection Units from the Jamastrán Valley

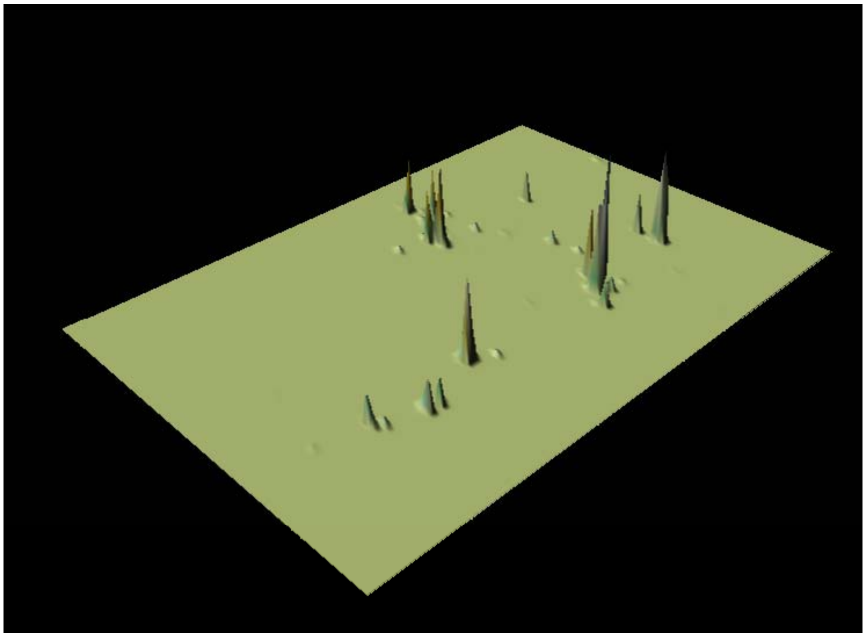

Figure 3.2a Surface Representing Sherd Densities in the Jamastrán Valley, Power 4

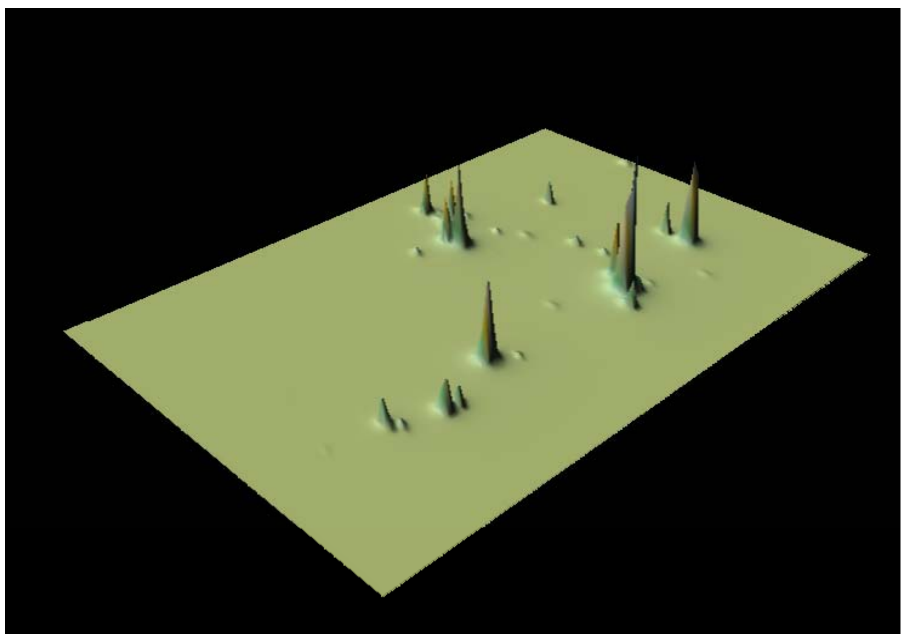

Figure 3.2b Surface Representing Sherd Densities in the Jamastrán Valley, Power 2

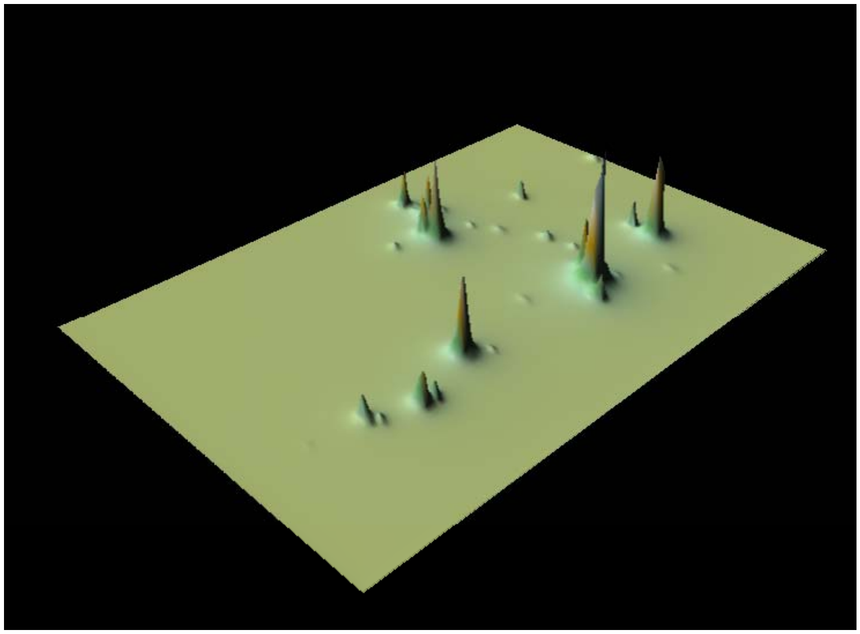

Figure 3.2c Surface Representing Sherd Densities in the Jamastrán Valley, Power 1.5

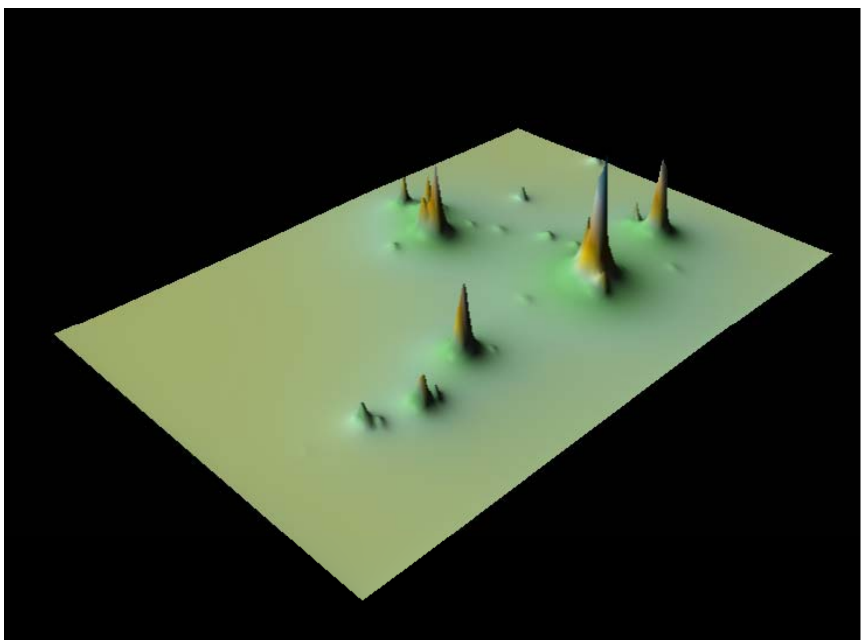

Figure 3.2d Surface Representing Sherd Densities in the Jamastrán Valley, Power 1

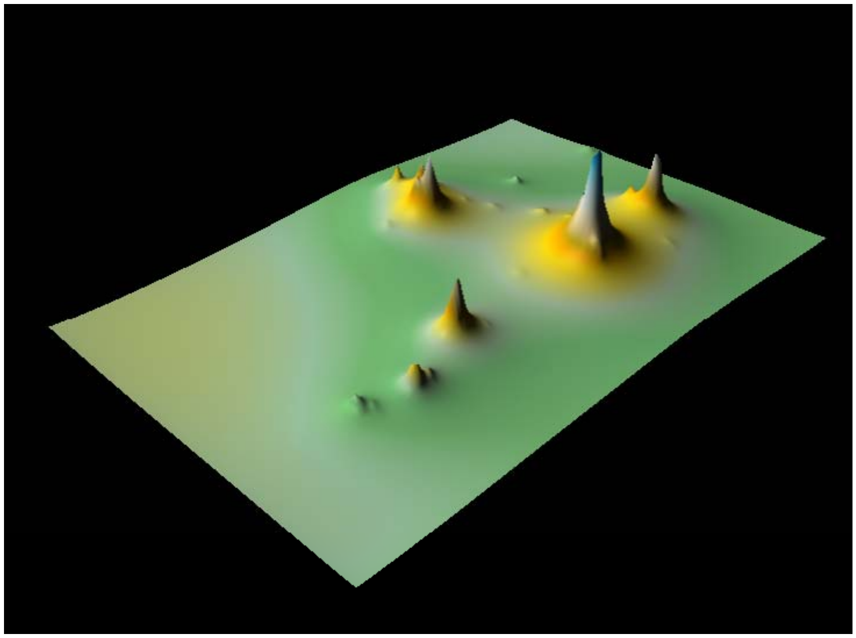

Figure 3.2e Surface Representing Sherd Densities in the Jamastrán Valley, Power .5

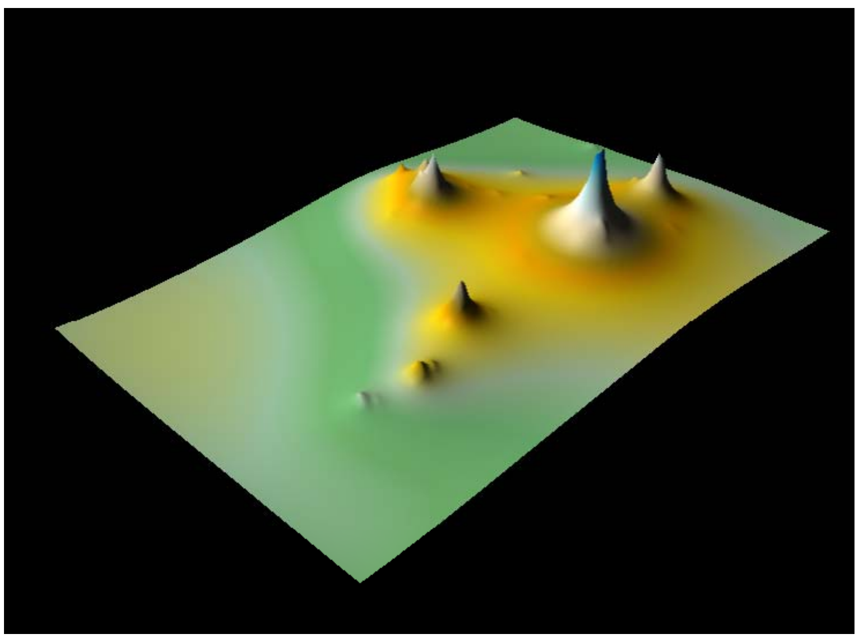

Figure 3.2f Surface Representing Sherd Densities in the Jamastrán Valley, Power .25

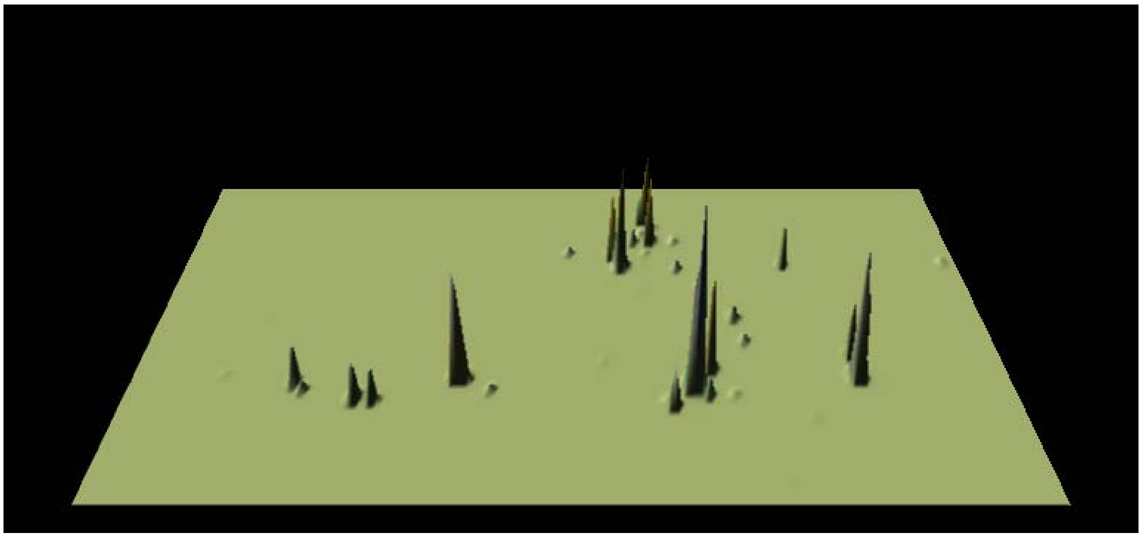

Figure 3.3 Surface Representing Sherd Densities in the Jamastrán Valley, Power 4

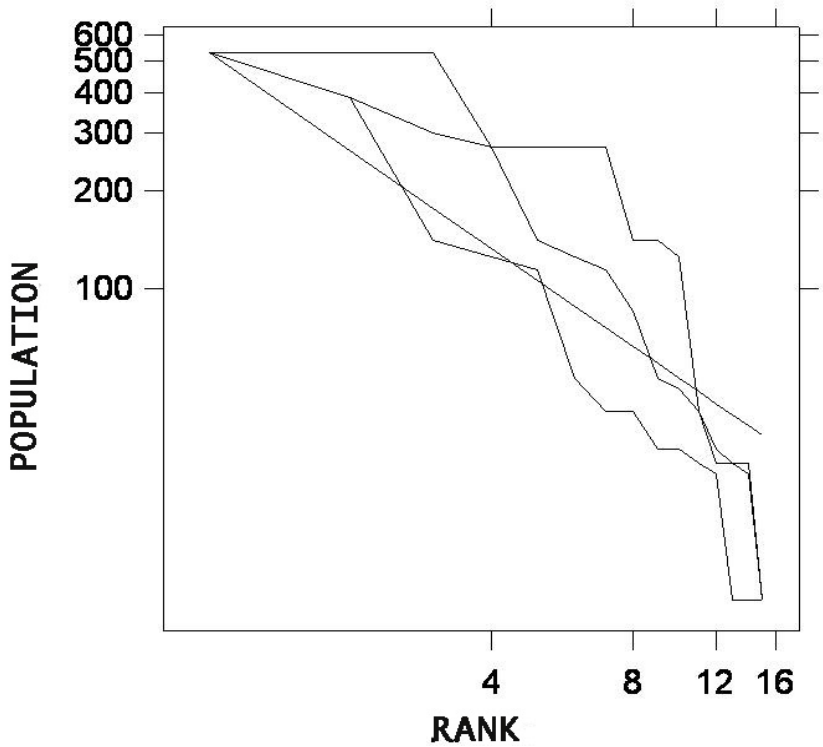

Figure 3.4 Rank-Size Graph Local Communities in the Jamastrán Valley Survey Area (A= .173, 90% Confidence)

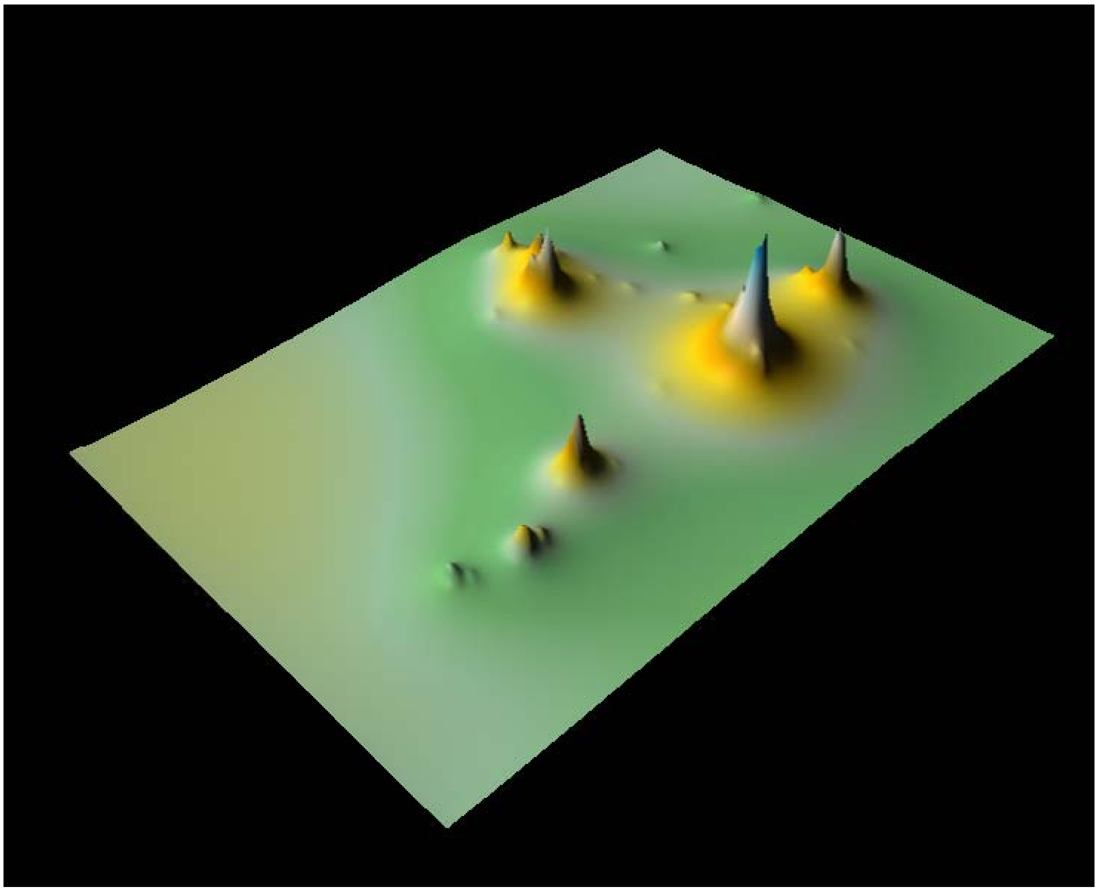

Figure 3.5 Surface Representing Sherd Densities in the Jamastrán Valley, Power .5

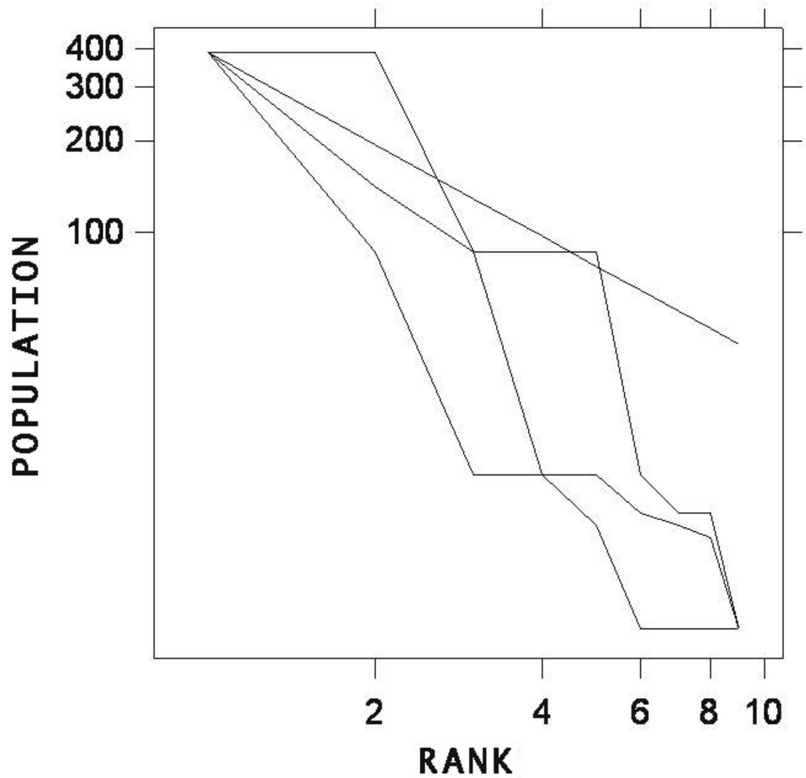

Figure 3.6 Rank Size Graph Calpules Regional Cluster in the Jamastrán Valley Survey Area (A= .801, 80% Confidence)

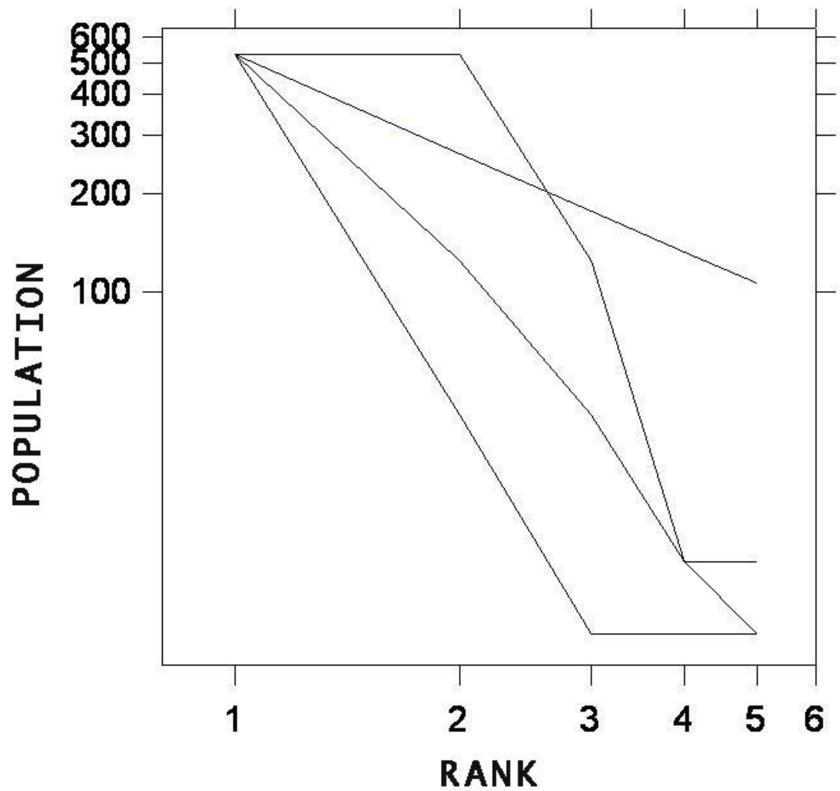

Figure 3.7 Rank Size Graph El Zapotillo Regional Cluster in the Jamastrán Valley Survey Area (A= -1.345, 80 % Confidence)

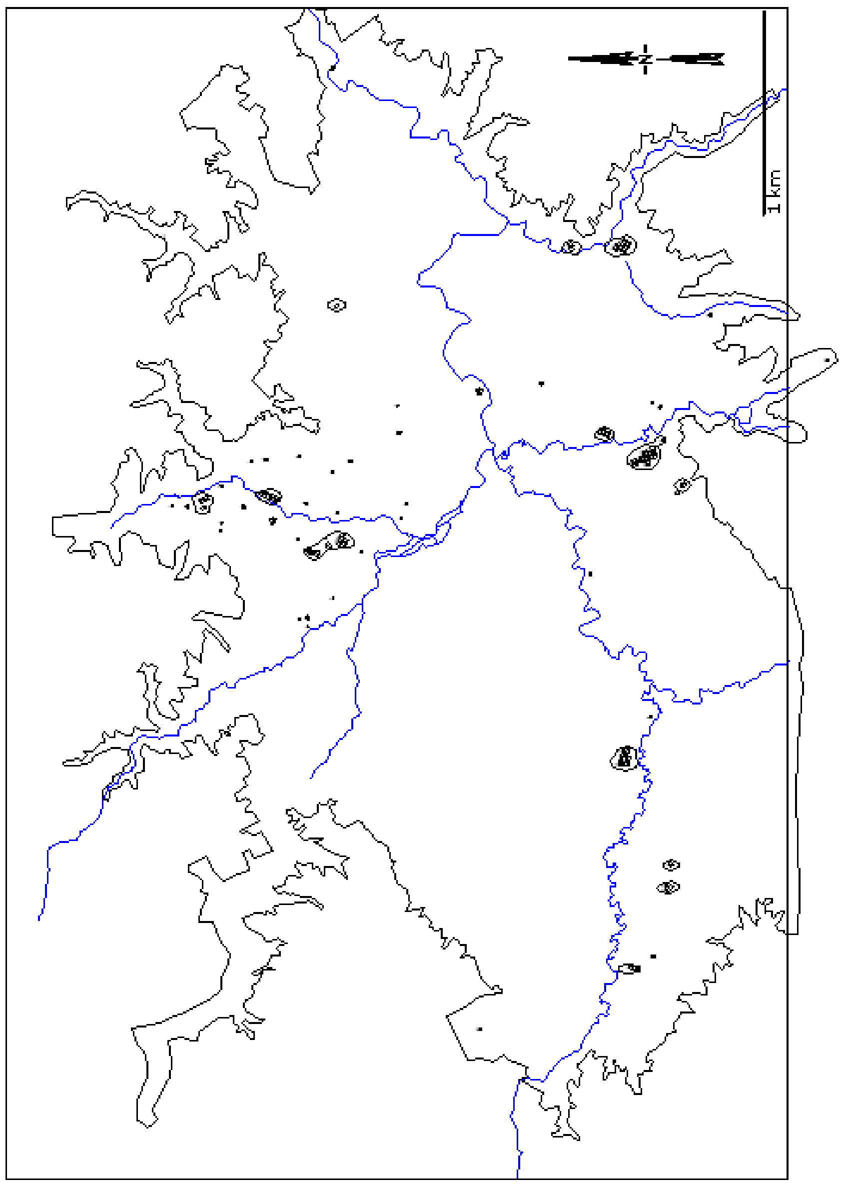

Figure 3.8 Local Communities in the Jamastrán Valley

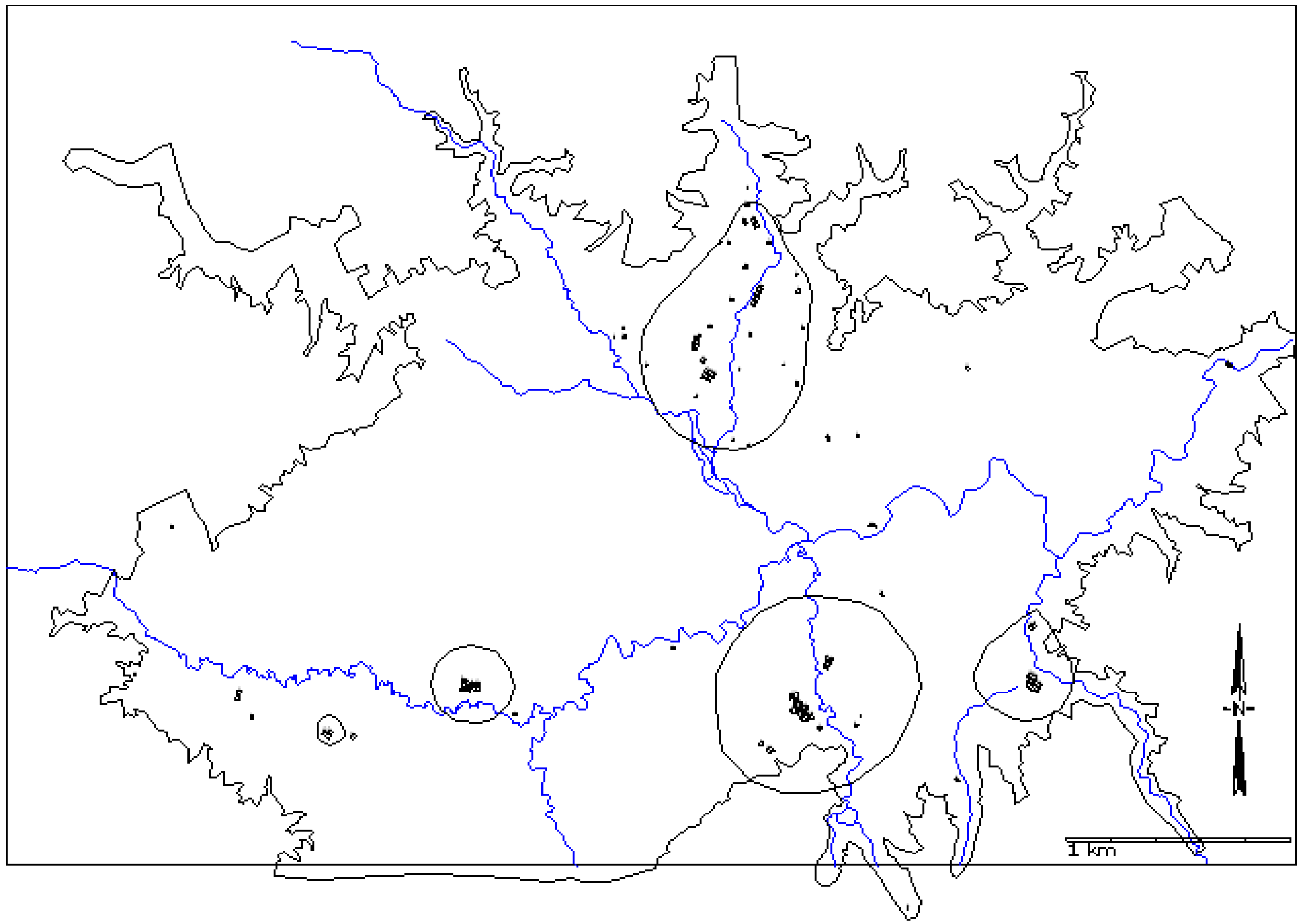

Figure 3.9 Regional Clusters in the Jamastrán Valley

Settlements	DAI	Minimum Population	Maximum Population	Mean population
1	7.78	55	117	86
2	1.01	7	15	11
3	12.87	90	193	142
4	35.30	247	530	388
5	2.45	17	37	27
6	2.70	19	5	12
7	4.49	32	67	49
8	27.40	192	411	302
9	11.40	79	171	125
10	48.22	337	723	530
11	3.88	27	57	42
12	24.84	174	373	274
13	2.90	20	44	32
14	10.36	73	155	114
15	4.81	34	72	53
16	0.94	6	14	10
17	1.49	10	22	16
18	1.48	10	22	16
19	0.41	3	6	**5**
20	1.09	7	16	12
21	1.46	10	22	16
22	1.38	9	21	15
23	2.19	15	33	24
24	1.49	10	22	16
25	0.79	5	12	8
26	1.33	9	20	15
27	0.96	6	14	10
28	0.55	4	8	6
29	1.19	8	18	13
30	1.03	7	15	11

Table 3.1 Population Estimates per Social Unit in the Jamastrán Valley

Settlements	Households	Hamlets	Villages
1			X
2	X		
3			X
4			X
5		X	
6		X	
7			X
8			X
9			X
10			X
11			X
12			X
13			X
14			X
15			X
16	X		
17		X	
18		X	
19	X		
20		X	
21		X	
22		X	
23		X	
24		X	
25	X		
26		X	
27	X		
28	X		
29		X	
30	X		
	63 people	**200 people**	**2137 people**

Table 3.2 Distribution of Population According to Type of Social Unit

Regional Clusters	DAI	Minimum Population	Maximum Population	Mean Population
1 (Calpules)	62.418	437	936	686
2 (Rancho Rosa)	32.195	225	483	354
3 (El Zapotillo)	65.562	458	983	721
4 (La Cañera)	24.841	174	273	224
5 (Santa Rosalia)	10.366	73	155	114

Table 3.3 Population per Regional Clusters and Different Areas in the Jamastrán Valley

Regional Clusters	DAI	Minimum Population	Maximum Population	Mean Population
I Calpules				
1	7.789	55	117	86
2	1.011	7	15	11
3	12.872	90	193	142
4	35.306	247	529	388
5	0.944	6	14	10
6	1.497	11	22	16
7	1.482	10	22	16
8	0.408	3	6	5
9	1.098	7	16	12
				686
II EL Zapotillo				
1	11.4	79	171	125
2	48.22	337	723	530
3	3.82	27	57	42
4	0.792	6	12	9
5	1.33	9	20	15
				721

Table 3.4 Population at the main Regional Clusters in the Jamastrán Valley

Regional Clusters	Area	Maximum Population	Population Density (people/ km²)
I. Calpules	13km²	936	72
II. El Zapotillo	14km²	983	70

Table 3.5 Population Densities within Regional Clusters

4. Agricultural Production

The general climate in Honduras consists of a dry season, known as *verano*, from November or December to April, and a wet season, called *invierno*, from May to October or November. It has been noted (Franco and Munns 1982) that the temporary interruption of rainfall in wet-dry climates permits organic matter to accumulate on the soil surface due to the slowdown in decomposition occasioned by the dry season. Organic matter is converted into nutrients when the fields are burned in preparation for planting. These nutrients are available for rapid uptake by plants, particularly after the first rains. The effects of wet-dry climates on agricultural production, then, translate into resilient riverbottom soils, which can be cultivated for several years (up to ten to twenty) in succession with no fallowing beyond the months between rainy seasons. So, the interruption of rainfed agriculture, due to a pronounced dry season, allows more sustainable agricultural production from a given unit of land under slash and burn cultivation than do wetter areas with year round rainfall (Locker 1981:55).

In the Jamastrán Valley, as in the rest of Honduras, the agricultural cycle is determined by the beginning of the rainy season. In the valley, the overall population depends on subsistence agriculture. A nuclear family, composed by 6 family members living under the same roof, farms a plot of approximately 3 ha annually (SAG 2000: 44). Maize is the most important crop for small farmers in the valley. On average, a 1 ha plot of maize is planted out of the total area of 3 ha cultivated by one family. The crop is planted as soon as regular rainfall begins in late May or early June. One common strategy for increasing agricultural productivity in the valley is multiple cropping. This agricultural intensification strategy is very sensitive to variations in rainfall; however, farmers in the Jamastrán Valley count on the reliability of rainfall to plant a second crop (*postrera*). The *postrera* is planted in late September or October, after harvest of the first crop. Small farmers in the Jamastrán Valley, without the assistance of chemical fertilizers, obtain annual maize yields of 1000 kg/ha. The second most important crop in the region is beans. On average, a .5 ha plot of beans is planted out of the 3 ha utilized by a nuclear family. Although they can be planted in a separate plot, beans are generally associated with the fallow cycle. Maintaining adequate moisture levels is important for farmers practicing multicropping in the plots where the *postrera* is planted. In order to do so the cleared vegetation is not burned but left in the fields to form a moisture retaining mulch. Beans are usually intercropped with a *postrera* planting, or intercropped with the mature maize of the first crop that has been or is about to be harvested. The cultivation of beans, intercropped in the *postrera* cycle, contributes to maintain the capacity of the soil to retain moisture. Annual bean yields are of 350 kg/ha. Nuclear families also cultivate several fruit trees (mango, oranges*, zapotes, nances*, and avocados, among others) and some root crops (malanga and manioc) in the available land closer to their houses.

4.1 Soil Types and Agricultural Production

There are three main agro-ecological areas in the Jamastrán Valley: the valley floor, the transitional areas (piedmont) and the steep slopes (SAG 2000:42). The valley floor area ranges from 500-700 m in elevation. The topography of this area ranges from flat to light slopes (0-4%), and the land is characterized by alluvial soils with high and medium fertility. The intermediate area is made up of transitional land between the valley proper and the steep slopes. This piedmont area ranges from 700-1,000 m in elevation. Here, soils are located on moderate slopes (10-20%) and are characterized by a rather low fertility. The step slopes area rangers from 1,000-1,800 m in elevation. The soils located in this area have severe erosion problems.

The Jamastrán Valley presents a relatively high degree of diversity in terms of soil composition (SAG: 2003). Twelve different soil units have been identified in the valley, but these can be broadly classified as alluvial and colluvial. Alluvial soils form terraces (low, medium and high) along the main rivers that traverse the Jamastrán Valley whereas colluvial soils are found in the piedmonts. Colluvial soils are poor and considered marginal for agricultural production, in contrast to the richer alluvial soils. In order to establish levels of productivity, soils in the Jamastrán Valley were classified into six different categories based on soil texture, drainage, mineral composition, pH levels, slope, and risk of flooding (SAG 2003:58-67). The description of the soils follows (Figure 4.1)

Type 1

These soils consists of arable lands with little restrictions for their use; they are flat, deep, fine-to-medium textured, with high nutrient availability, fertile, well drained, with fairly good moisture holding capacities, good water infiltration rates, and do not exhibit detrimental salt accumulations. Type 1 soils do not require the implementation of drainage techniques. There is no risk of flooding and the potential productivity of the soils is very high.

Type 2

These soils consist of arable lands with less productive capacity than Type 1 soils. They are more shallow soils, with less moisture holding capacities, more permeable, and finer textured than Type 1 soils. However, their productivity is very good, although not as high as the Type 1 soils. There no risk of flooding.

Type 3

These soils present similar characteristic of Type 2 soils. However, their topography is more broken and might have restricted drainage capacities (less moisture holding capacities) which imply more water requirements.

Type 4

These soils present similar characteristics of Type 2 soils. These are apt to support intensive horticulture activities, fruit trees, and pastures. The deficiencies of these soils lie on their risk of periodic flooding, and inadequate drainage.

Type 5

These soils present similar characteristics of Type 2 soils. However, they are exposed to high risks due to flooding, which might be a limiting factor regarding their permanent cultivation.

Type 6

These are very shallow soils, with irregular topography, and high levels of erosion. They are not apt for agricultural activities.

The classification of soils in the Jamastrán Valley does not provide exact productivity values. The classification offers a scale of optimal soils for agricultural production, taking into account not only fertility but also topographic features that might impose difficulties for production. The soils could be regarded as having high productivity potential (Type 1), good-moderate productivity potential (Type 2), moderate-low productivity potential (Type 3, 4, and 5) and non arable soils (Type 6 soils, which are clearly regarded as not apt for agricultural activities).

4.2 Carrying Capacities

Modern crop yields from the Jamastrán Valley provide information about the necessary annual agricultural production for the subsistence needs of a family of six. The average family farms a 3 ha plot in which it cultivates maize, beans and other cultigens such as root crops and fruit trees. Apart from seed for next year´s crop and provision for storage losses, little agricultural surplus is generated by small farmers in the Jamastrán Valley. Corn yield estimates in the valley provide a figure of 1000 Kg/ha per year. Higher crop yields have been reported for the Jamastrán Valley (SAG 2003:44) in plots where chemical fertilizers were used. A widely-used ethnographic estimate of maize consumption is one metric ton of maize per year per peasant household of five individuals, which coincides with modern maize yields for the Jamastrán Valley. The agricultural estimates for modern Jamastrán are within the range of what has been calculated for other areas in the Americas. For instance, Milner and Olivier (1999) indicate that maize yields of Eastern Woodland and Plain groups were between 650-1,300 Kg/ha. The average yield of maize in the Jamastrán Valley is similar or superior to areas in southern and western Honduras (SAG: 2003) but below average yields estimated for other ones, such as El Cajón region in Central Honduras. Locker (1989:159) points out that a hectare of average *vega* land in El Cajón would yield about 1,831 Kg of maize per year over a 20 year period. Although there is not a straight-forward correlation between modern crop yields and ancient ones, modern and historic information on agricultural activities can provide an understanding of prehispanic crop yields and land productivity. We should, however, keep in mind that during the past 2,000 years the Jamastrán Valley has experienced changes in climate, acquisition of new technologies, use of fertilizers and pesticides in modern agricultural practices and changes in soil fertility. The make up of cultigens has also been subjected to changes through time.

Each family of small producers in the Jamastrán Valley, with little or none access to fertilizers, cultivates a 3 ha plot of land utilizing a multicropping and/or intercropping strategy. The agricultural technique practiced in the valley is the slash and burn type. Farmers practice long-term, almost permanent cropping of their fields, with little fallow or shifting to new plots. Small-farm agriculture in Jamastrán is characterized by the use of simple technology and low capital input. Agricultural production is mainly for home consumption. As mentioned before, maize and beans constitute the basic crops in the diet of the valley´s inhabitants. Surface remains recovered through the survey provide only indirect evidence of maize consumption, in the form of *manos* and fragments of *metates*. Historical sources indicate that maize was cultivated throughout Honduras regardless of topographic and climate settings and albeit differences in the intensity of production and its relative importance in particular diets.

Contact sources indicate that the most important food crops cultivated in Honduras were maize (*Zea mays L.*), beans (*Phaseolus vulgaris L*, and other varieties), manioc (*Manihot esculenta Crantz*) and sweet potatoes (*Ipomoea batatas [L.] Lam*), although in comparison to eastern Honduras root crops were less significant in the diet of the inhabitants of western and central regions of the country (Newson 1986:55-57). For western, central and eastern Honduras, early historic accounts describe that in addition to larger field plots along the banks of the rivers; permanent gardens were maintained next to the dwellings where trees, gourds, herbs, spices, fruit and dye plants were cultivated (Newson 1986:55).

Archaeological remains provide additional data on annual crops, trees, and wild plants utilized in ancient Honduras. Despite difficulties encountered in the identification of archaeological plant remains in the El Cajón region due to poor conservation of the specimens, the analysis of these botanical remains constitutes one of the most complete inventories in the country. The prehispanic inhabitants of the Sulaco River (El Cajón region) relied on maize, beans, and a great variety of plants for their sustenance (Lentz 1989). One of the most common plant remains recovered from archaeological contexts of the El Cajón region was *coyol* palm (*Acronomia mexicana*). This tree is native to Honduras and is widely cultivated throughout the country. It is usually found in gardens next to the houses or in more distant fields where the tress are left standing during slash and burn activities. Coyol can be eaten fresh, oil can be extracted from the kernel, and also a fermented beverage is produced from it. This beverage has been reported by early twentieth century ethnographies of eastern Honduras (Conzemius 1932) and its production can be found today in many regions of the country, including the Jamastrán Valley where the drink is very popular among *campesinos.* Other plant remains recovered from El Cajón region include *zapote* (*Pouteria* cf *mammosa*), *nance* (*Byrsonima crassifolia*), *negrito* (*Simarouba glauca*), *capulin* (*Muntingia calabura*) and wild plum or *ciruela* (*Spondias* sp.). These plants provided sources of carbohydrates, vitamins, and minerals to the diet of the El Cajón inhabitants (Lentz 1989:189-199). Early historical accounts as well as twentieth century ethnographies (Newson 1986, Conzemiuz 1932) indicate that all these plants were cultivated or selectively cut around when clearing the forest, as noted by Lentz (1989:201), in different regions of Honduras. These fruit trees are cultivated today in the Jamastrán Valley.

This research evaluates the potential of agricultural production in the Jamastrán Valley, considering that 3 ha of land are required for a family of six to produce annual crops, fruit trees and other cultigens. Based on this figure we estimated that one person would need .5 ha to fulfill daily caloric requirements. Maximum carrying capacities were calculated based on data of soil productivity and compared to maximum population estimates for prehispanic Jamastrán. Maximum carrying capacity refers to the level of population that can be supported during average crop years as opposed to optimum carrying capacities, which refers to the population that can be supported during periodic lean years (Hassan 1978). As pointed out by Sanders (1997:383) carrying capacity is not an absolute value, but rather a shifting scale related to the level of intensification of resource use. Therefore, the concept refers to the amount of land necessary to support a certain number of people in a given economy, under particular environmental conditions, strategy of land use and technology (Hassan 1978:73, Sanders 1997:383).

The total area of different soil types (ranks) was converted into the maximum number of people it could support using the productivity values of modern Jamastrán (Table 4.1). Type 1 soil (2,245 ha), type 2 soil (7,265 ha), type 3 soil (1,045 ha), type 4 soil (414 ha), type 5 soil (8,483 ha), type 6 soil (248 ha), could have supported 4490, 14530, 2090, 828, 16966, and 496 people, respectively. From these estimates, the maximum carrying capacity of the valley would be 39,400 people, considerably above the maximum population estimate of 3,272 people (or

3,289, if we take into account the small settlements with less than 1 person that were not incorporated into further demographic analysis in Chapter 3) for the entire valley.

Therefore, only 8.3% of the carrying capacity of the valley was reached during prehispanic times. It is clear, then, that population pressure over subsistence resources was not a factor that affected settlement location in the Jamastrán Valley. It is worth pointing out that 82.7% of the population established their communities on the lands with higher agricultural potential (soil types I and II) which make up 48% of valley floor area. This distributional pattern suggests that high productivity soils and closeness to permanent water sources would have been the most desired locations for agriculturalists in Jamastrán. However, there is a considerable amount of high productivity land underused in the valley (Figure 4.1), suggesting that regarding competition over the most productive agricultural resources, population pressure on resources is out of the question for prehistoric Jamastrán.

4.3 Catchment Areas

Catchment analysis evaluates resource levels available within a given area and distance from a community. It measures, for instance, the amount of land available to the inhabitants of a community, and explores the productivity of the area directly exploited by them (Steponaitis 1981:325). Catchment areas were created using maximum population estimates for each settlement of the Jamastrán Valley and average soil productivity. These estimates were used to determine that 3 ha of average crop productivity could provide the subsistence needs of a family of six (or .5 ha per person). A catchment circle was drawn around the center of each settlement (village, hamlets and households) to include the area of agricultural production needed to support the settlement's population. The radii of the catchment circles are determined by modern agricultural production in the Jamastrán Valley; therefore, they are biased towards the production of annual crops. Data from other regions indicates that a 2.5 km radius catchment area may be exploited by the inhabitants of a settlement to provide the necessary land to cultivate maize, squash and other cultigens, as well as construction material for residences (Flannery 1976:108). A similar catchment area (2 km radius) has been calculated for the El Cajón region, based on the average distance that present day farmers walk to their *milpas* (Locker 1989:163). The average distance indicated by Locker (1989) seems consistent with information from other areas of the country. In eastern Honduras, Pech and Tawahka communities currently exploit catchment areas of similar sizes for agriculture, hunting, fishing, and gathering of materials to build houses, canoes, musical instruments, and collecting medicinal plants (Conzemiuz 1932, González et al. 1996, Gómez Suarez 2001)

The circles illustrated in Figure 4.3 represent the catchment areas each community in the Jamastrán Valley would have needed to exploit. These areas would have included sufficient agricultural resources, as well as wild plants and game. Information on the actual resources available to the inhabitants of the Jamastrán Valley can be only inferred by ethnohistoric and ethnographic sources. I would like to stress the constant mention in early historical accounts of gardens located next to the dwellings. It is suggested by these accounts, as well as by ethnographic information of the late nineteenth and early twentieth centuries, that a great variety of fruit trees were grown in household gardens, and that these gardens were rather frequent occurrences. Other important fruits, besides the ones mentioned earlier, that were cultivated in gardens were guava (*Psidium guajava L.*), avocado (*Persea Americana Mill*) and pineapple (*Ananas comosus [L] Merr.*). Squash (*Crescentia cujute L.*) and peppers (*Capsicum frutescens L.* and *C. annum L.*) were also commonly found in household gardens (Newson 1986:57). Observations of early twentieth century explorers indicate that in eastern Honduras plots were cleared and cultivated on a communal basis. While root crops would have been harvested from nearby plots every few days more distant plots would have been visited less frequently (Newson 1986:71, Conzemius 1932). This pattern is still observed in eastern Honduras among the Tawahka and Pech communities along the Patuca River and Olancho (González et al. 1996, Gómez Suarez 2001).

Wild animals were abundant at the eve of the conquest, and hunting was an important subsistence activity. The animals more commonly mentioned in early colonial sources included deer (*Odocoileus virginianis* and *Mazama Agmericana*), tapirs (*Tapirus bairdii*), armadillos (*Dasypus novemcinctus*), and peccaries (*Tayassu* spp). Early accounts also mentioned that smaller animals such as iguanas, frogs, snakes and many insects were also eaten, as well as a large number of birds (Newson 1986:59-76). Newson (1986:76) indicates that in eastern Honduras hunting was an important activity, and that most animals were probably caught in the vicinity of plots where they came to forage; however, hunting expeditions lasting several days would have exploited more distant hunting grounds. A variety of hunting techniques and weapons were reported in early colonial accounts of eastern and northeastern Honduras. In the early twentieth century, Conzemius (1932) reported the use of wooden arrow points for hunting among Tawahka communities along the Patuca River. The abundance of fish on the cost, lagoons and rivers of northern and eastern Honduras was commented by early European observers. River fishing was apparently widely practiced, but the activity is not described in detailed in the documentary record (Newson 1986:77). Collection of wild fruits and vegetable products such as honey, beeswax, gums, resins and balsams also took place, and played a more important role in the diet of eastern Honduran groups than from those in western and central areas.

Figure 4.2 illustrates how the catchment areas of small villages encompass the catchment areas of closer hamlets and households, and the catchment areas of larger villages encompass the catchment areas of nearby smaller villages, and/or those of hamlets and households as well. There are some (6) isolated hamlets and household whose catchment areas do not overlap with the catchment areas of other communities. The distribution of the catchment areas provides an image similar to the ¨closer interaction areas¨ or regional clusters identified with the surface maps (Power .5). The catchment areas of the local communities in the Jamastrán Valley overlap each other quite substantially within the larger regional-scale communities delineated in Chapter 3, but there is little or no overlap of catchment areas between local communities in different regional-scale clusters. This separation of hypothetical catchment areas between larger settlement clusters reinforces the conclusion that this regional-scale clustering reflects relatively integrated social units at the regional scale. This pattern suggests that catchment areas at the scale of the regional clusters could have been shared among neighboring local communities to fulfill their agricultural needs, fishing, some hunting and collecting of vegetable products and construction materials.

In sum, the carrying capacity estimates, along with the catchment area analysis, suggest the following: 1.There is no basis for imagining competition over agricultural or ecological resources in general in the Jamastrán Valley. 2. There is no overall population pressure on subsistence resources in the area. 3. High productivity soils and closeness to permanent water resources are the desired locations for settlements. 4. Most of the population in the valley congregated in these areas of optimal settlement. Communities in the Jamastrán Valley, then, are located to maximize access to prime agricultural land.

4.4 Population Densities and Agricultural Practices

Agricultural intensification can take different forms; modification of the landscape, shortened follow cycles, increased labor inputs and a variety of cultural practices that raise soil fertility (Locker 1989:55). Modern and ancient examples from Honduras indicate that population rise and/or pressure is not a necessary precondition for agricultural intensification (SAG 2000, Hirth et al. 1989). Multi-cropping, intercropping, and crop rotation are common agricultural practices intended to maximize land use. Additionally, adequate crop rotation could contribute to increase land fertility (SAG 1974). Agricultural intensification of this kind might not leave the material remains that other intensification activities do; however, the spatial patterning of settlements is helpful to tackle this issue. A dispersed settlement pattern has been associated with agricultural practices related to intensification (Drennan 1988). The dispersed settlement pattern for the whole valley, along with low population densities at the regional and community scales (Table 4.3) suggests that an ¨infield-outfield¨ agricultural system might have been used in the Jamastrán valley. Historic and etnohistoric accounts, as well as archaeobotanical evidence for other regions in Honduras indicates that kitchen gardens coexisted with distant plots as part of a combined agricultural strategy. The dispersed communities in the Jamastrán valley seem to have considered the advantages of concentrating their agricultural labor requirements in small plots adjacent to each household (Drennan 1988:287).

The location of communities in the valley, along the circum-riverine area and within the tropical deciduous forest, parallels the choices of settlement location for other regions in Honduras (Hasemann 1987, Dixon 1989, Lentz 1989; Begley 1999). It has been noted that slash-and burn-agriculturalists value deep and fertile soils (Carneiro 1961; Sanders 1977, 1981), which are commonly found in areas covered by deciduous forests located in the *vegas* and valley bottons along rivers. Earliest agriculturalists favored these environments due to their high productivity and access to wild resources. Considering the limitations imposed by stone tools in clearing large expanses of land, the areas within the tropical deciduous forest would have been more useful after they have been cleared with fire, leaving valuable trees undisturbed, and then small plots of land could have been more easily maintained by households.

After planting and until harvest, the agricultural labor concentrates on weeding, which is the most time consuming activity of the agricultural cycle and the major factor limiting the size of agricultural plots (Locker 1989:51). Intercropping would have contributed to combat weed growth. A reduction in the time needed to weed agricultural lands could have been used to engage in alternative subsistence activities. So, closeness to the agricultural plots was advantageous to the agriculturalists communities in the valley to maximize soil fertility, reduce transportation times, concentrate labor requirements, as well as to utilize resources found within the circum-riverine environment which can be exploited on a daily basis by simple gathering techniques.

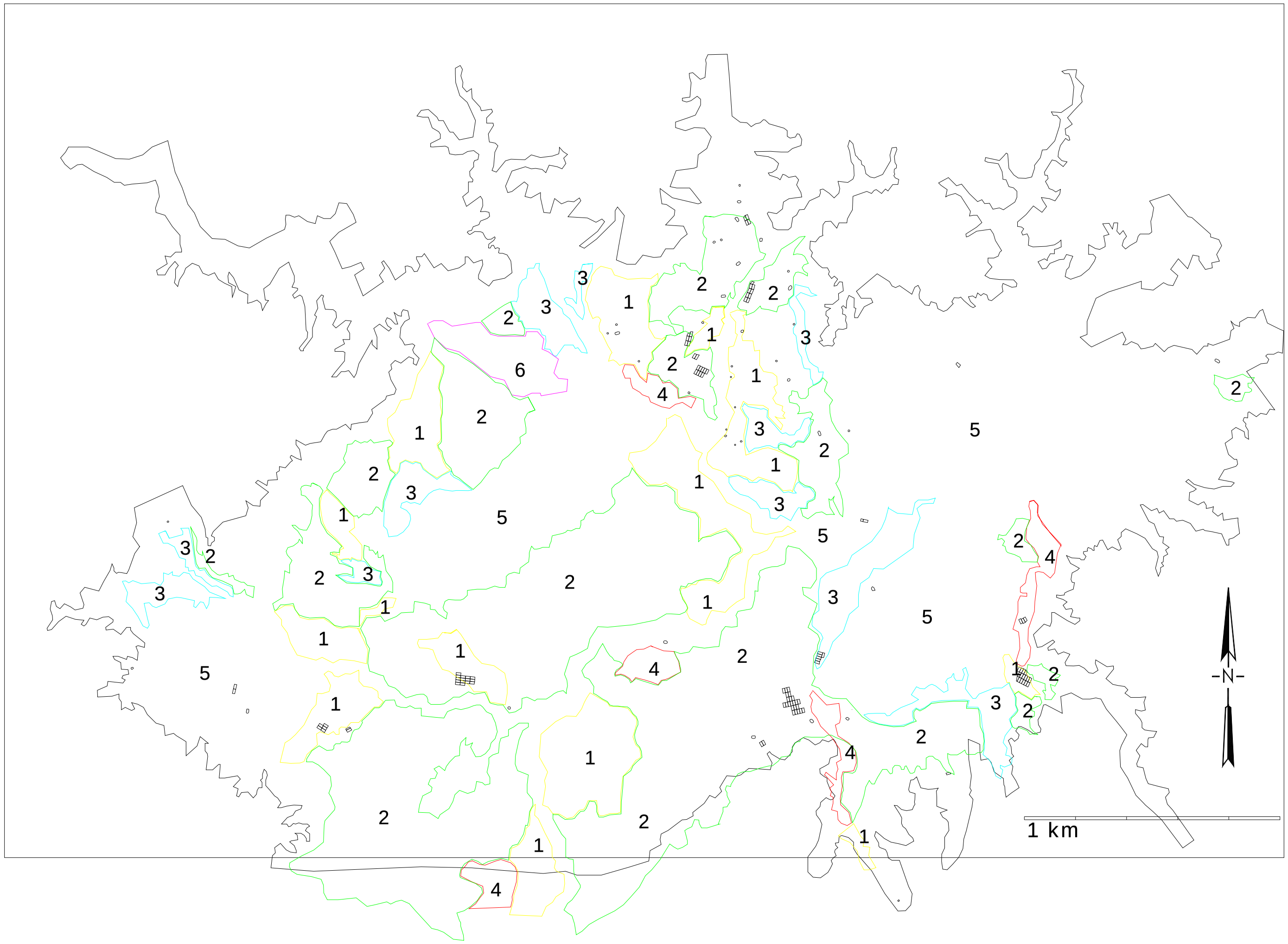

Figure 4.1 Soil Types in the Jamastrán Valley (see Table 4.1)

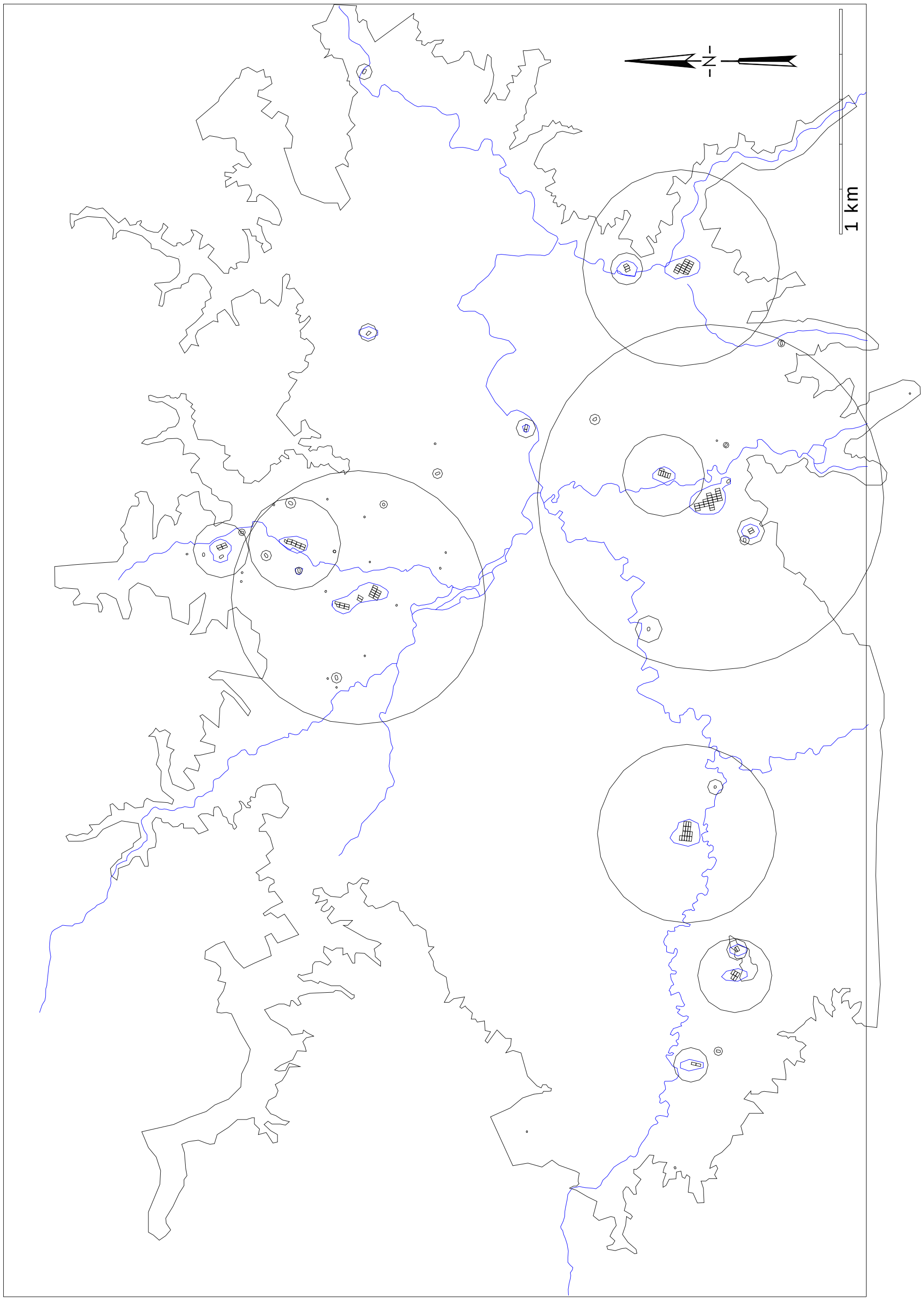

Figure 4.2 Catchment Areas in the Jamastrán Valley

Soil Type	Soil Type Area (ha)	Maximum Carrying Capacity (people)	Estimated Population	Population Percentage (%)
1	2,245	4,490	967	29.5
2	7,265	14,530	1,741	53.2
3	1,045	2,090	171	5.2
4	414	828	67	2.1
5	8,438	16,966	326	10.0
6	248	496	0	0.0

Table 4.1 Maximum Carrying Capacities by Soil Types

Settlement	Settlement Area (ha)	Maximum Population	Catchment Area (km²)
1	15.71	117	0.58
2	1.61	15	0.07
3	14.64	193	0.96
4	34.65	529	2.65
5	7.90	37	0.18
6	1.54	41	0.21
7	9.48	67	0.34
8	25.03	411	2.05
9	10.84	171	0.85
10	38.62	723	3.62
11	8.03	57	0.28
12	25.26	373	1.86
13	5.85	44	0.22
14	9.75	155	0.77
15	8.30	72	0.36
16	0.32	14	0.07
17	0.44	22	0.11
18	0.49	22	0.11
19	0.24	6	0.03
20	0.41	16	0.08
21	0.47	22	0.11
22	0.43	21	0.10
23	0.52	33	0.16
24	0.41	22	0.11
25	0.28	12	0.06
26	0.41	20	0.10
27	0.37	14	0.28
28	0.22	8	0.04
29	0.40	18	0.09
30	0.33	15	0.07

Table 4.2 Catchment Areas in the Jamastrán Valley

Settlement	Population Density (people/ha)
1	5
2	7
3	10
4	11
5	4
6	19
7	5
8	12
9	12
10	13
11	5
12	11
13	5
14	12
15	6
16	6
17	10
18	10
19	3
20	7
21	10
22	9
23	15
24	10
25	5
26	9
27	6
28	4
29	8
30	7

Table 4.3 Population Density by Communities in the Jamastrán Valley

5. Craft Production and Local Exchange

Evidence of two kinds of non-agricultural activities was thought to be present in the Jamastrán Valley: lithic and pottery production. We expected that settlements engaging in craft production ought to yield high proportions of production waste and manufacturing tools, by which production activities could be identified. Surface collecting resulted in the recovery of 746 lithic artifacts from 238 collection units. The lithic sample from the Jamastrán Valley consists of 739 flake stone tools and the refuse from their production, and seven ground stone artifacts (*manos and metate*).

Flaked tools and production waste were divided into seven categories: scrapers, blades, projectile points, tool blanks, cores, production tools, and debitage (Table 5.1). We have excluded material recovered from 37 spot findings given the lack of ceramic evidence to date them. So, a total of 94 artifacts were eliminated from the final analysis. From 25 datable settlements we recovered 645 flake stone artifacts; 34 made of chert and 611 of obsidian.

General debitage makes up the bulk of the sample (520 artifacts), accounting for 81% of the total collection. This category consists of the refuse produced from the reduction of an objective piece. It includes the refuse of percussion shaping and cortex removal of complete and/or partially processed cores, discarded tools, wastage from core rejuvenation and other debris. All 25 settlements yield lithic refuse, ranging from 1 to 144 flakes. Chert macro flakes comprise 4% (21 counts) of the debitage sample.

A total of 57 cores were recovered during the survey, including 23 exhausted cores, 2 nodules, and 8 unidirectional polyhedral cores for prismatic blade production. These cores were probably abandoned in most cases due to their reduced size, and as exhausted nuclei. Evidence of constant rejuvenation might indicate that cores were also abandoned due to manufacturing errors that made difficult subsequent flake removal. Fourteen settlements yield cores, ranging from 1 to 23 counts. Chert cores make up 14% (8 counts) of this category.

16 tool blanks or performs are part of the lithic sample of the valley. Under this category there were included detached pieces potentially modifiable into a specific tool form, as well as lithic tools just prior to reaching a final form. Three of them are chert blanks, accounting for more than 18% of this category. Tool blanks represent 2.48% of the total lithic collection.

A total of 21 scrapers were recovered during the survey. They were defined as detached flakes made of obsidian or chert, produced by percussion retouch of the distal end of flakes. All the specimens from the valley are sidescrapers. All but two of the scrapers show signs of continuous resharpening. Two scrapers were made of chert, accounting for 9.5% of this tool category.

Blades are flakes with approximately parallel sides and an area more than twice as long as it is wide. 18 prismatic blades were recovered during the survey. These blades are removed by a pressure technique from the polyhedral core in its final stage of reduction. Two prismatic blade points were recovered during the survey. These points are the result of retouching prismatic blades into projectile points. Both artifacts are probably arrow points. The presence of blades, projectile points, polyhedral cores, and associated debitage, indicates that local prismatic blade production took place in the Jamastrán Valley.

The use of direct hard hammer percussion is indicated by the recovery of 1 andesite hammerstone. Naturally, this is such a sporadic occurrence to determine the spectrum of tools and techniques applied in the production of lithics in Jamastrán. In fact, and considering the presence of prismatic blade production in some communities, it is reasonable to argue that soft percussion instruments and pressure blade-removal techniques were utilized by lithic producers in the valley along with the use of hard hammer percussion.

5.1 Settlements and Lithic Production

The number of stone tools and debitage from 25 settlements ranges from 1 to 196. Variations in the proportions of lithic artifacts among settlements provide useful information about which ones placed more emphasis on lithic production. Figure 5.1 shows a scatter plot of proportions of lithic materials within total artifacts counts (ceramics and flake tools and debitage) for each settlement. This scatter plot reveals a ¨sense of convexity¨ in terms of smaller settlements showing more evidence of lithic material than ¨what would be expected¨ according to their sizes. In fact, there is a very weak negative correlation between settlement size and proportion of lithic materials ($r = -.143$, $p=0.49$); that is, larger settlements tend to have lower proportions of chipped stone tools. It is not surprising that small settlements show evidence of production, but it is significant that some of them present high proportions of lithic material in terms of the total material count. In this regard, the scatter plot also resembles the pattern observed in the rank-size graph for the whole valley; that is, a regional scenario in which larger communities did not dominate the manufacture of lithic implements, but rather most likely autonomous villages produced their lithic artifacts at different levels of intensity and scale.

It has been mentioned that debitage frequencies range from 1 to 144, accounting for 80% of the lithic sample. It has been also noted that debitage was recovered from all 25 settlements with evidence of lithic materials. The presence of debitage in all settlements then suggests that each settlement is producing percussion flakes, identified as general debitage. At the regional level, the proportion of lithic material seems to indicate a broad distribution of lithic production among settlement of differing sizes. This pattern might point to a relative autonomy of the communities (villages, hamlets and households) in the valley in terms of basic (percussion flake) lithic production, or at least regarding partial self-sufficiency in tool manufacture. From the six smaller settlements (from 10 to 32 people on average per settlement) that yielded proportionally high counts of lithic material, three hamlets present evidence of blade production, which suggests that these settlements are engaging in more specialized forms of tool production. The high proportion of lithic materials observed in the rest of the smaller settlements might indicate their engagement in agricultural and other subsistence activities.

From the 25 settlements with evidence of percussion flake production, 14 also present additional evidence of the first stages of lithic production besides debitage; that is, cores and blanks. More than 86% of the total lithic material for each one of those settlements reflects involvement in the first steps of tool production. With the exception of four settlements (settlements 7, 9, 11 and 30, three villages and one household respectively), the rest also show evidence of secondary steps of production or finishing of tools. In this regard, 9 settlements stand out in terms of yielding higher proportions of debitage, cores and blanks, as well as showing different stages of lithic production, as well as evidence of blade production. A discussion of core blade production in the Jamastrán Valley will be presented later in the chapter.

The distribution of obsidian cores points to some differences among areas of the Jamastrán Valley. The regional clusters of Calpules and El Zapotillo concentrate 85% of the cores recovered in Jamastrán (54% and 31% respectively). The settlements in the southwestern part of the valley concentrate 7% of the cores and the settlements in the eastern part 8%. This pattern might represent differences in provisioning and/or distribution of obsidian in different areas of the valley. In order to explore patterns of differential access or provisioning of obsidian, we calculated the frequency of cortex of each artifact per settlement (Table 5.2), following Sheets´ (1983) approach to the Zapotitlán Valley collection. Low cortex frequencies would indicate that communities were receiving obsidian in well prepared form. Higher cortex frequencies, on the other hand, would indicate less prepared forms of raw material arriving at the valley. On average, settlements within the Calpules regional cluster present a 66% cortex figure, 59% for the settlements within the El Zapotillo regional cluster, 60% for the settlements in the southwestern part of the valley, and 52% for the eastern settlements.

The less processed state of obsidian, indicated by higher frequencies of cortex and more presence of obsidian cores, suggests that some communities had more direct connections, or closeness, to obsidian sources. On the other hand, lower cortex frequencies among other communities might reflect more involvement in secondary steps of tool production. Considering that the obsidian sample from the whole valley presents a 59% cortex figure, and taking into account different observation about the material, it is probable that obsidian arrived in the valley as nodules, and probably more frequently as core preforms.

5.2 Obsidian Sources

Three different sources of obsidian were identified through visual examination of all artifacts from the Jamastrán collection; La Esperanza, Güinope, and an unknown source. The La Esperanza obsidian source is located in the southwestern highlands of Honduras (Figure 5.2). Obsidian nodules ranging from 1 to 30 cm in diameter have been reported from that region along *quebradas,* and mining areas consisting of narrow vertical shafts (Sheets et al. 1990). Obsidian debitage was identified adjacent to the mines, where initial reduction took place. There was no evidence for the manufacture of finished goods at the mines or the workshops identified during a survey of the La Esperanza region (Sheets et al. 1990:146).

The Güinope obsidian source is located in southeastern Honduras, 40 km east of the Jamastrán Valley. Surveys carried out in the Güinope area (Aoyama 1989, Sheets et al. 1990) indicate that obsidian was abundant along the floor of the *quebrada*, occurring as exposed, water-worn cobbles ranging from 1 to 15 cm in diameter. Rough percussion flakes, small flake cores, and some debitage were identified, but there was no evidence of the presence of workshops in the area. Research has concluded that obsidian from Güinope apparently occurs only as rock debris left as erosional ¨float¨ from an ancient obsidian flow (Sheets et al. 1990:147). Sheets et al. (1990:148) point out that the obsidian cobbles observed at Güinope rarely exceeded 10 cm in diameter, which led them to conclude that while Güinope obsidian was well suited for a variety of percussion-flake cores and tools, most nodules are ¨too small to be transformed into percussion macrocores and then into polyhedral cores for the manufacture of prismatic blades.¨ However, Sheets et al. (1990:151) also indicate that analysis of six artifacts from the Ninderi site in western Nicaragua, including three prismatic blades, matched the chemical composition of the Güinope source. Additionally, Hirth (2002) in a more recent publication points out that research at Xochicalco (Morelos, Mexico), demonstrates that most of the prismatic blades manufactured there between 650-900 AD were produced from small cores less than 2-3 cm in diameter and 4-6 cm in length. A hand-held technique, as opposed to a foot-held technique, has been proposed to be used to produce blades from small cores.

It is worth mentioning that none of the surveys in the Güinope area, and to a lesser degree those in the La Esperanza region, were systematic nor exhaustive; in fact, it seems that research relied mostly on information from residents to locate the presence of obsidian in both areas. It is possible that different obsidian flows within the Güinope source area are yet to be located, as indicated by the presence of artifacts from an unidentified source, similar in several chemical characteristics to Güinope, in the El Cajón region in central Honduras (Sheets et al. 1990:150). Obsidian sources from Nicaragua have been reported (Sheets et al. 1990:151, Lange 1992:174) but little studied. Obsidian from two sources in western Nicaragua is described as consisting of small nodules, ranging from 1-6 cm in diameter, a ¨small size to render Mesoamerican core-blade technology¨ (Sheets et al. 1990:151). From the region of Las Segovias, in northern Nicaragua, obsidian nodules from an unknown source are described as small, ranging from 3 to 5 cm in length and related flakes recovered in the region are characterized by high cortex percentages (Espinoza et al. 1990:34).

Contrary to our initial assumption regarding the predominance of the Güinope source in the Jamastrán Valley, this accounts for only 10% (n= 60) of the total obsidian sample. Most of our sample comes from an unknown source (n=357), which makes up 58% of the sample, followed by obsidian from La Esperanza source (n= 194) accounting for 32% of the sample (Table 5.3). Not all settlements seem to have access to the same obsidian sources; in fact, there is considerable variation in the proportion of specific sources present at different settlements. Only 4 villages in the valley present obsidian from the three sources; these are settlements 10, 4 and 12 (the largest villages in Jamastrán) and settlement 15 (the second largest village in the southwestern part). A considerable percentage of obsidian from Güinope was recovered from one settlement (number 4) for the Calpules regional cluster, comprising 58% of the sample from the Güinope source (Table 5.3). However, Güinope obsidian does not represent the most frequently used source in the Calpules regional cluster, or any other area in the Valley.

Whereas obsidian from Güinope and the unknown source were used for the manufacture of scrapers and for percussion core-flaking, the La Esperanza obsidian was used for prismatic blade manufacture. The Jamastrán valley´s knappers privileged obsidian from a more distant source to produce prismatic blades due to its higher quality, and perhaps due to the larger size of its nodules as well. The variability in the proportion of different obsidian sources and particular uses for tool making suggests that independent, but overlapping, procurement strategies were in place at the valley.

Taking into consideration that most of the obsidian is entering the valley in a less-processed estate, and the fact that most basic tools are made of a closer source, Güinope, and an unknown one, we consider it likely that the later one might be located not that far away. Research along the Honduran-Nicaraguan border will be necessary to tackle the issue of obsidian procurement and exchange in eastern Honduras and north-western Nicaragua. More research in the region will also contribute to recent efforts to highlight the variability of core-blade technology (see Hirth 2002, 2003) in Mesoamerica and Lower Central America.

5.3 Scrapers and Blades

Scrapers and blades are differentially distributed among settlements in the valley. A total of 21 scrapers were recovered from 6 settlements (5 villages and 1 hamlet). Most of them (66% of the scraper sample), including the only two scrapers made of chert, were recovered from settlement 4, the second largest settlement in the valley and the largest village in the Calpules regional cluster. In fact, 81% (n=17) of the scrapers were recovered from the Calpules cluster (where 28% of the total population of the valley resided), 14% (n=3) from two villages in the southwestern area of the valley, and 5% (n=1) from a hamlet in the eastern part. There is no evidence of specialized production of scrapers at particular settlements in the Jamastrán Valley. It is most likely that these tools were produced at each settlement, at the household level, for their own consumption. Scrapers were made from Güinope obsidian (n= 2) and more frequently (n= 17) from obsidian of an unknown source. It is worth noticing that scrapers were not recovered at any settlement from the El Zapotillo regional cluster, where 30% of the total population of the valley resided and the largest village in the region is located.

The differential distribution of scrapers in the region will have to be further analyzed through use-wear analysis in order to determine the particular functions these tools might have had and to address the possible differences between toolkits in the valley, as they relate to differences in productive activities. Although only two scrapers from the collection are made of chert, this also might indicate differences in productive activities, given that chert scrapers have tougher cutting edges than obsidian, and may have been preferred for some harsher tasks.

A total of 18 blades were recovered from 5 villages in the valley, 44% (n=8) from settlement 4; 22% (n=4) from settlement 1 (both villages from the Calpules region); 17% (n=3) from settlement 10, the main village in the El Zapotillo regional cluster; 11% (n=2) from settlement 12 in the southwest part of the valley, and; 6% (n=1) from settlement 7, located in the southeastern part of the valley. In addition to these complete blades, we also encountered evidence of prismatic core-blade production such as polyhedral cores, several fractured blades, and two projectile points (Figure 5.3). In contrast to the widespread use of percussion flake technology in the valley, only nine settlements show evidence of specialized blade production.

Obsidian core-blade technology permitted the production of prismatic blades, very sharp cutting tools whose manufacture requires some skill. The process of core-blade production involves the shaping of polyhedral cores using percussion techniques and producing prismatic blades using pressure techniques. The result of first and second-series blade removal from a polyhedral core is a final pressure core. The blades removed from the pressure core can be modified for different uses in many different ways, such as projectile points and notches tools (Hirth 2002:4).

Polyhedral cores are the most reliable indicator of local prismatic blade production. From the nine settlements with evidence of core-blade production in Jamastrán four settlements yielded polyhedral cores. It is most likely that cores for blade production arrived in the valley as secondary macrocores and as polyhedral cores processed outside of the valley. Each regional cluster has one settlement that engages in all the steps of blade production and one or two settlements which concentrate on tool finishing (Table 5.4). Villages 4, 10 (the largest settlements in the Calpules and El Zapotillo regional clusters), 15 (the second largest village in the southwester part of the valley) as well as hamlet 24, in the eastern part of the valley, yield cores and a series of fractured blades classified as debitage along with other wastage. One hammerstone was recovered from settlement 10. On the other hand, five settlements yield only fractured blades and other debris, which might indicate engagement in secondary steps of production, as well as indirect access to polyhedral cores. It is probable that some of the fractured blades are not mistakes but blanks for the manufacture of prismatic points.

The evidence of prismatic blade production in Jamastrán suggests that minimal craft specialization was taking place among some households in the valley. It also suggests a different procurement strategy than the one observed for the manufacture of more basic percussion flake production. The distribution of La Esperanza obsidian seems to have been more restricted than that of Güinope and the unknown source (Figure 5.4).

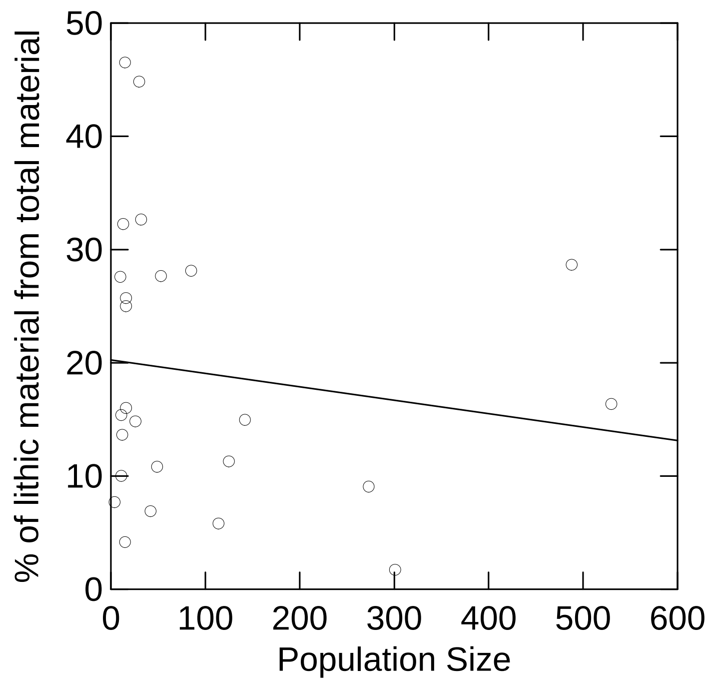

Figure 5.1 Chipped Stone Material and Settlement Sizes in the Jamastrán Valley

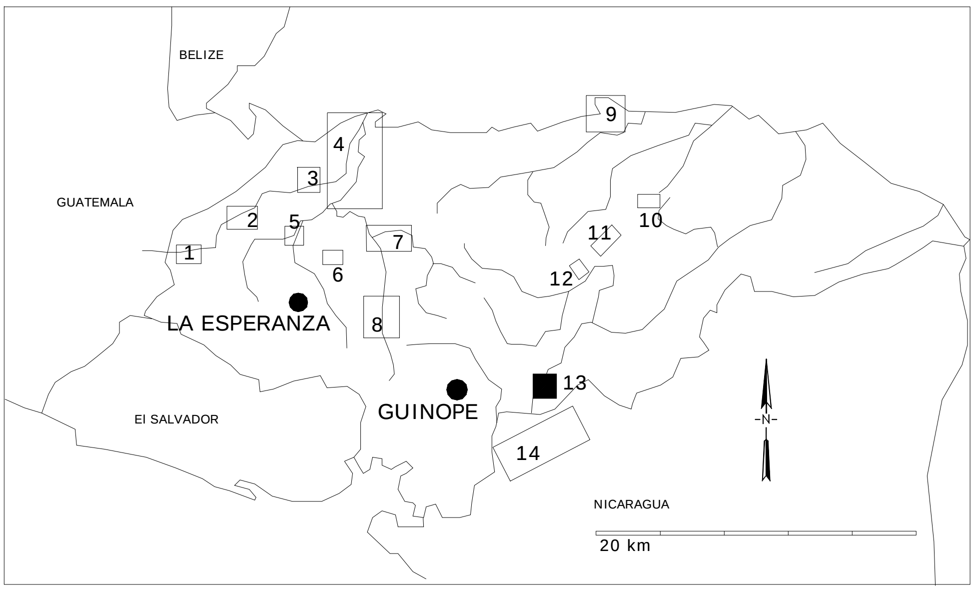

Figure 5.2 Obsidian Sources (Güinope and La Esperanza)

Figure 5.3 Polyhedral Cores and Fractured Blades

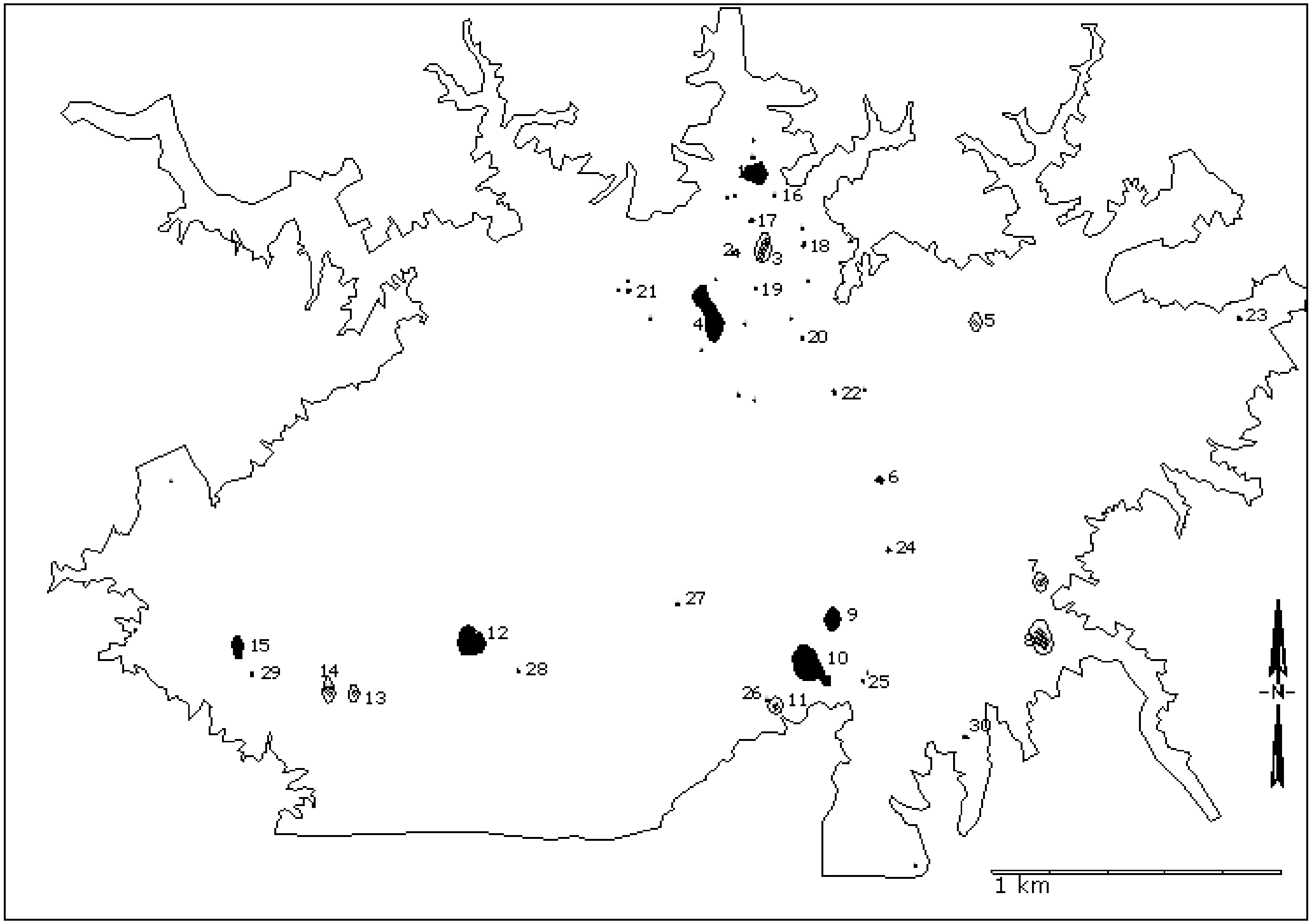

Figure 5.4 Distribution of La Esperanza Obsidian and Prismatic Blade Production

(see Table 5.3)

Settlement	Debitage	Cores	Blanks	Scrapers	Blades	Points	Hammer-stone	Total
1	32	5	2	2	4	0	0	45
2	0	0	0	0	0	0	0	0
3	23	8	0	1	0	0	0	32
4	144	23	7	14	8	0	0	196
5	3	0	0	0	0	0	0	3
6	37	1	0	1	0	0	0	39
7	6	1	0	0	1	0	0	8
8	7	0	0	0	0	0	0	7
9	20	1	0	0	0	0	0	21
10	111	17	1	0	3	1	1	134
11	3	1	0	0	0	0	0	4
12	30	1	0	2	2	0	0	35
13	12	1	2	1	0	0	0	16
14	9	0	0	0	0	0	0	9
15	24	2	0	0	0	0	0	26
16	8	0	0	0	0	0	0	8
17	8	0	0	0	0	0	0	8
18	4	0	0	0	0	0	0	4
19	1	0	0	0	0	0	0	1
20	3	0	0	0	0	0	0	3
21	0	0	0	0	0	0	0	0
22	1	0	0	0	0	0	0	1
23	0	0	0	0	0	0	0	0
24	5	3	0	0	0	1	0	9
25	0	0	0	0	0	0	0	0
26	14	2	4	0	0	0	0	20
27	2	0	0	0	0	0	0	2
28	0	0	0	0	0	0	0	0
29	10	0	0	0	0	0	0	10
30	3	1	0	0	0	0	0	4
	520	**67**	**16**	**21**	**18**	**2**	**1**	**645**
%	**82.17**	**8.83**	**2.48**	**3.25**	**2.79**	**0.31**	**0.15**	

Table 5.1 Chipped Stone Material from the Jamastrán Valley

Settlement	Cortex Frequencies	Cortex %
10	77	57
4	115	58
8	0	0
12	27	77
3	25	78
9	9	43
14	2	43
1	35	75
15	11	42
7	2	8
11	3	75
13	11	68
6	12	31
5	2	66
17	6	75
18	2	50
24	7	77
22	0	0
26	10	71
29	8	80
20	1	33
27	2	100
30	2	50
16	7	87
19	0	0

Table 5.2 Obsidian Cortex Frequencies

Calpules Regional Cluster							
Settlement	**Güinope**		**La Esperanza**		**Unknown**		**Total Obsidian**
	No.	**%**	**No.**	**%**	**No.**	**%**	
10	3	2.44	37	30.08	83	67.48	123
4	35	19.02	59	32.06	90	48.91	184
8					7	100.00	7
12	3	9.37	9	28.13	20	62.50	32
3			1	3.13	31	96.87	32
9			5	25.00	15	75.00	20
14					8	100.00	8
1			13	28.88	32	71.11	45
15	1	4.00	23	92.00	1	4.00	25
7			1	16.66	5	83.33	6
11	4	100.00					4
13			1	6.25	15	93.75	16
6			3	8.11	34	91.89	37
5					3	100.00	3
17			8	100.00			8
18			1	25.00	3	75.00	4
24			9	100.00			9
22					1	100.00	1
26			18	94.74	1	5.26	19
29	10	100.00					10
20			3	100.00			3
27					2	100.00	2
30	4	100.00					4
16			2	25.00	6	75.00	8
19			1	100.00			1
	60	**9.82**	**194**	**31.75**	**357**	**58.42**	**611**

Table 5.3 Obsidian Sources in the Jamastrán Valley

Calpules Regional Cluster			
Settlements	**Polyhedral Cores**	**Debitage**	**Points**
4	**1**	**5**	0
3	0	0	0
1	0	**3**	0
17	0	0	0
18	0	0	0
21	0	0	0
20	0	0	0
2	0	0	0
16	0	0	0
19	0	0	0
El Zapotillo Regional Cluster			
Settlements	**Polyhedral Cores**	**Debitage**	**Points**
10	**3**	**11**	**1**
9	0	**1**	0
11	0	0	0
26	0	**9**	0
8	0	0	0
Southwestern Area			
Settlements	**Polyhedral Cores**	**Debitage**	**Points**
12	0	**1**	0
14	0	0	0
15	**2**	**1**	0
13	0	0	0
29	0	0	0
28	0	0	0
Eastern Area			
Settlements	**Polyhedral Cores**	**Debitage**	**Points**
8	0	0	0
7	0	0	0
6	0	**3**	0
5	0	0	0
23	0	0	0
24	**2**	**2**	**1**
22	0	0	0
30	0	0	0

Table 5.4 Blade Production by Regional Clusters in the Jamastrán Valley

6. Interregional Interaction

The wide distribution of raw materials and finished items in the archaeological record of prehispanic Honduras has stimulated the academic interest in different aspects of interregional commercial networks and interactions; in fact, exploring the nature and operation of interregional interactions have been one of the main research objectives in the country (e.g., Baudez 1973, Henderson 1977, 1978, 1988, Wonderly 1981, Healy 1984, 1992, Joyce 1985, 1986, 1991, Schortman et al. 1986, Ashmore 1987, Schortman and Urban 1987; Dixon 1989, Schortman and Urban 1991, Hirth 1992, Begley 1999). Undoubtedly, eastern Honduras participated in exchange networks with distant neighbors; however, our current archaeological evidence suggests that only modest amounts of commodities were mobilized through interregional exchanges with those societies (Healy 1992, Begley 1999). Begley´s (1999) work in the Culmí Valley, Olancho, indicates that templates for public architecture (including ballcourts) were adopted from western Honduran groups; however, there is only scanty evidence of interaction manifested through portable trade objects. Interregional exchange of luxury items can be used as part of elite prestige-seeking strategies by creating a connection with the distant (Helms 1979), becoming ¨cultural brokers¨ (Spencer 1994), or establishing ties with other elites through the exchange of prestige goods and/or sharing a common ¨elite etiquette¨ (Ashmore 1987). Interaction between western and central Honduran elites and their counterparts in eastern Honduras do not seem to have resulted in systematic prestige- goods exchange (Begley 1999, Cuddy 2007). On the other hand, interregional exchange within eastern Honduras is still in need of further and more systematic analysis. Our study of the Jamastrán Valley aims to contribute to that task.

Ceramics have been the most reliable indicator of social interaction in eastern Honduras. Although the ceramics of eastern Honduras have been described as being remarkably homogenous throughout the region (Begley 1999:152), recent research points to intraregional variations regarding ceramic assemblages and what they represent in terms of intraregional interactions (Beaudry-Corbett 1995, Begley 1999, Winemiller and Ochoa-Winemiller 2009). Archaeologists working in eastern Honduras have relied on Epsteins´s (1957) ceramic typology and chronology to identify and date their materials. Epstein analyzed ceramics from the Bay Islands and areas of northeastern Honduras collected by Bird in the 1930s and by Kidder, Stromsvik and Ekholm in the 1950s. Epstein (1957) identified two main phases, termed Selin and Cocal, which spanned from approximately 600 to 1520 AD. The main criterion for differentiating these phases was the predominance of particular decorative motifs; the earlier phase seems to include polychromes and appliqué decoration, while the later phase consists mostly of incised and punctuated designs. Healy´s analysis (1978a, 1978b) of northeastern ceramics refined the original typology elaborated by Epstein but retained the main chronological framework and attributes for differentiation. Beaudry-Corbett´s (1995) analysis of ceramic material from the Chichicaste site, and some materials from the Talgua village and the Talgua and Jamasquire caves (all in Olancho) identified a group of ceramics not recognized (and probably misidentified) until then in the region. This ceramic group is known as Chichicaste. The identification of this ceramic group has contributed to point out a greater diversity of ceramic traditions in eastern Honduras as well as to recognize more nuances in its intraregional interactions.

6. 1 The Imported Ceramics of the Jamastrán Valley

Ceramics recovered during the survey of the Jamastrán Valley were used basically as temporal markers and as indicators of external contact. Most, 71%, of the ceramic material recovered is of local manufacture while the rest of it is imported (Table 6.1). From the imported ceramics 99% are from the Chichicaste Group and 1% (seven sherds in total) from the Ulúa Valley. The identified varieties of Chichicaste polychromes from the Jamastrán Valley are Rojo Granate and Geometrico, which have been dated to between 600-900 AD. The Rojo Granate shares stylistic similarities with the Cancique Group from central Honduras, and the Geometric is closely related to ceramics from the Sulaco drainage (El Cajón region) in central Honduras as well. According to Beaudry-Corbett (1995:5) the Geometric polychromes are part of the Sulaco Group; however, the Chichicaste examples present marked differences in relation to the ones from the El Cajón region. Therefore, although the polychromes from Chichicaste have been related to central- Honduras ceramic traditions, they constitute a local development suggested by formal and iconographic analysis (Beaudry-Corbett 1995:12). A characteristic of Chichicaste polychromes is that the main pictorial image in painted in the interior of the pots, a spatial arrangement shared with ceramic traditions from Costa Rica and Late Classic Maya pottery. Anthropomorphic and zoomorphic images, in particular saurian motifs, resemble those from contemporaneous traditions from Nicaragua, Costa Rica, Panamá, central and western Honduras. On the other hand, Chichicaste present similarities in vessel forms with some Ulúa Polychromes. However, the whole composition of the motifs, and their uses for particular ceramic forms, suggests a local tradition with ¨its own internal rules, narrative structure and content¨ (Beaudry-Corbett 1995:14). Other lines of evidence, such as the presence of ovens (kilns), discarded pottery and other production waste, indicates that the Chichicaste polychromes were manufacture at the site of Chichicaste, in the Olancho region (Beaudry-Corbett 1995, Gómez Zúñiga 1995, Beaudry-Corbett et al. 1997).

The ceramics from the Ulúa Valley recovered in the Jamastrán Valley are part of the Red Group, which represents the earliest evidence of manufacture of the Ulúa polychromes. The Ulúa polychromes are a major serving ware component of the Ulúa Valley ceramics. These elaborated polychromes comprise several groups containing multiple types and varieties (Beaudry Corbett et al. 1997). The Red Group was first produced in the Ulúa Valley during the late Early Classic and early Classic Period (around 500-600 AD). During excavations in the Culmí Valley, Begley (1999: 153) recovered ¨several¨ (frequencies are not provided) Ulúa Polychrome sherds which resemble the Contador type from the Red Group. He (Begley 1999: 153) dates the contexts in which the Ulúa Polychrome sherds were recovered to late Period IV-b or early Period V, around 600-700 AD, slightly later than the evidence from the Ulúa Valley but more consistent with the occurrence of this pottery type in eastern Honduras and neighboring regions. Ceramics from the Red Group of the Ulúa Polychrome have been recovered from excavations in the Las Segovias region, in northern Nicaragua, dating to the Casa Blanca phase (600-800 AD). Espinoza et al. (1996:106) points out that chemical analysis of some Ulúa polychrome sherds recovered in Las Segovias suggest the possibility of local manufacture.

6.2 Distribution of Chichicaste Polychromes in the Jamastrán Valley

A linear regression between the proportions of imported pottery, from the total count of ceramics, and settlement size (population size) for the entire Jamastrán Valley reveals a mild positive correlation between the two variables ($r = .531$, $p = .003$). Figure 6.1 shows a scatter-plot of these variables. So, although the larger settlements in the valley yielded high proportions of imported ceramics so did some smaller settlements. This pattern is also present in the El Zapotillo regional cluster, but here one hamlet yields proportions even slightly higher than the larger village in the cluster. In the Calpules regional cluster, on the other hand, the main village shows considerable larger proportions of imported ceramics than any other settlement in the cluster ($r = .926$, $p < .0005$). Settlements in the southwestern part of the valley show an extremely low correlation between settlement sizes and proportions of imported ceramics ($r = .002$, $p = .99$), which is attributed to the lack of integration among those communities. The settlements in the eastern parts of Jamastrán exhibit the overall pattern for the whole valley. The regional clusters of Calpules and El Zapotillo present similar percentages of imported pottery within each cluster (34% and 38% respectively), whereas the settlements in the southwestern and eastern parts yielded 15% and 13% of the imported ceramics recovered in the entire valley. Differential distributions of imported ceramics in the regional clusters and in more loosely integrated areas of the valley suggest differential access to external interactions and exchanges.

6.3 Distribution of Ulúa Polychromes in the Jamastrán Valley

Seven sherds, making up 1% of the total count of important ceramics, were identified as types from the Red Group of the Ulúa Polychromes; one of the Contador type and the rest probably of the Cyrano type. Six of the sherds recovered during the survey come from the main village in the El Zapotillo regional cluster, and the other sherd from the main village in the Calpules regional cluster. The low frequency of Ulúa Polychromes recovered in the Jamastrán Valley seems to coincide with what has been recorded for the Las Segovias region in northern Nicaragua (Espinoza et al. 1996). Based on visual examination alone, and given the lack of chemical analysis of the examples of Ulúa polychromes recovered during our survey, we have worked under the assumption that they represent imports and not items of local production as may be the case for some examples recovered in neighboring the Las Segovias region. Such low proportions of Ulúa Polychomes from our sample are most likely an indicator of indirect access to this pottery as well as indirect interaction between communities in Jamastrán and the Ulúa Valley. Their scarcity might also suggest that these items were luxury commodities.

6.4 Interactions with Olancho and Las Segovias

Archaeological research in Eastern Honduras suggests that prehispanic societies participated in both inter- and intraregional exchange networks (Stone 1941, 1957, 1984, Strong 1948, Healy 1974, 1978, 1992, Hasemann 1992, Beaudy-Corbett 1995, Brady et al. 1995, Begley 1999, Winemiller and Ochoa-Winemiller 2009). Data derived from archaeological research at the sites of Chichicaste and Dos Quebradas (Beaudry-Corbett 1995, Gómez Zúñiga 1995, Winemiller and Ochoa-Winemiller 2009), have provided more information about production and exchange of goods, namely ceramics, in some areas of eastern Honduras. The site of Chichicaste shows evidence of production of the Chichicaste polychromes recovered at different settlements in the Culmí Valley (Begley 1999), settlements in the Talgua drainage (Beaudry-Corbett 1995), the site of Dos Quebradas in the Telica Valley (Winemiller and Ochoa-Winemiller 2009), and from 80% of the settlements in the Jamastrán Valley.

Chichicaste is located along a tributary of the Telica River known as Quebrada Chichicaste. The site might cover 500 m across (Gómez Zúñiga 1995, Winemiller and Ochoa-Winemiller 2009). The occupation of the site has been dated to 300 BD to 800-900 AD (Beaudry-Corbett 1995:12, Beaudry-Corbett et al. 1997:53).The site contains three architectural groups surrounding a low area or *bajo*. The architectural features of the sites are low terraces and mounds and ramps. A distinctive feature at Chichicaste is a dome-shape structure (identified as a kiln feature) associated to a dense deposit of fragmented ceramics (Beaudry-Corbett et al. 1997:53). An archaeomagnetic date from the floor of the kiln places its final use at 890-905 AD. Additional evidence that indicates pottery production in the community consists of warp or bloated sherds (wasters) representing firing failures, pieces decorated by ¨apprentices¨ as indicated by very ¨cursory, sloppy execution of designs¨ (Beaudry-Corbett et al. 1997:54).

Dos Quebradas is located 9 km apart from Chichicaste. Recent work at the site (Winemiller and Ochoa-Winemiller 2009) indicates that it might have extended over an area of 67 ha. Winemiller and Ochoa-Winemiller (2009: 6) argue that the settlement has a distinctive elite core area characterized by a restricted access to its main plaza, larger structures (the tallest structure has a height of 9 to 10 m), massive terrace construction, and stone monoliths. The site core of Dos Quebradas is surrounded by clusters of low domestic earthen mounds. Variability in the architectural features at the settlement along with differential distribution of ceramics; finer pottery is found at the core site whereas more coarse ware in non-elite contexts, led Winemiller and Ochoa-Winemiller (2009:6) to propose that at some point in time Dos Quebradas was a stratified society.

Differences in the assemblages of Chichicaste and Dos Quebradas suggest functional distinctions between both settlements. Beaudry-Corbett (1995:11) points out that ceramics recovered from the Chichicaste site indicate that some of the inhabitants of the community were engaged in the production of pottery as well as in other productive activities. Chichicaste yielded higher percentages of coarse pottery than the neighboring Dos Quebradas, where the presence of fine pottery is significant (Winemiller and Ochoa-Winemiller 2009:8). Dos Quebradas fine pottery includes Chichicaste polychromes and other ceramics resembling those commonly found in northeastern Honduras and the Culmí Valley. Distribution of ceramics in both sites also suggests spatial differences; at Chichicaste coarse wares are found in most areas whereas fine pottery is more abundant in terraces or spaces nearby (Winemiller and Ochoa-Winemiller 2009:8). On the other hand, at Dos Quebradas higher proportions of coarse ware pottery are recovered from areas surrounding the architectural core but not the core itself (Winemiller and Ochoa-Winemiller 2009:8). These patterns might reflect differential access to fine pottery among different household at Dos Quebradas, as well as evidence of discrete areas of fine pottery production at Chichicaste in accordance with Beaudry-Corbett´s observations (1995:11).

A systematic survey of the Telica Valley, where Chichicaste and Dos Quebradas are located, is still undergoing (Winemiller and Ochoa-Winemiller 2009), so there is no concrete data about the relationship among settlements in the region; however, the evidence at hand seems to indicate that Dos Quebradas was an important center in the region at some point of its occupancy. The relationship between the ceramic- producer community of Chichicaste and Dos Quebradas also needs evaluation in order to explore the presence of Chichicaste polychromes in many areas of eastern Honduras. Were the elites at Dos Quebradas controlling the production and/or distribution of Chichicaste Polychromes? Are Chichicaste Polychromes symbols of the ¨elite etiquette¨ of some areas in eastern Honduras? Only further research in the Telica Valley and other areas of eastern Honduras would help us answer these questions.

Ceramics similar to Chichicaste polychromes have been reported in the Las Segovias region. Espinoza et al. (1996:93) recovered pottery, a type named Caucalí Rojo, that they associate with central Honduran types belonging to the Sulaco Group and Cancique Policrome. Caucalí Rojo, dated to 600-800 AD, is very similar to the Rojo Granate type of the Chichicaste polychromes. It has not been established whether Caucalí Rojo was locally manufactured or imported. More research in northern Nicaragua and further analysis of Caucalí Rojo, will be helpful to explore interactions, currently unknown, between the Las Segovias Region and eastern Honduras.

Formal characteristics of Chichicaste polychromes, such as decorative motifs and use of pictorial space, suggest shared features with pottery from neighboring regions. According to Beaudry-Corbett (Beaudry Corbett 1995, Beaudry-Corbett et al. 1997:58), Chichicaste pottery is a locally developed tradition, but one that accepted influences from ¨foreign cultures and adapted these representational forms according to their own requirements.¨ Based on the distribution of Chichicaste pottery in the Olancho region and the formal analysis of these polychromes, Beaudry-Corbett and other archaeologists (Beaudry-Corbett et al. 1997:58) point out that the society producing and exchanging Chichicaste pottery might have been an ¨independent political entity which had long-term connections, probably economic in nature, with foreign cultures from Mesoamerica and Lower Central America.¨

If the Chichicaste polychromes are in fact evidence of elite exchange in eastern Honduras, it is likely that some aspiring local leaders in the Jamastrán Valley were engaging in such interactions in order to bolster their political status or gain social prestige. By the same token, the presence of Chichicaste polychromes in the Jamastrán Valley might reflect the prestige strategies of the elites at Dos Quebradas. The mild positive correlation between settlement sizes and proportion of Chichicaste pottery in Jamastrán could be the result of a combination of procurement strategies that could include redistribution of imported pottery from the larger settlements to neighboring smaller communities, which could be the case of the Calpules regional cluster, or relatively direct access of most communities in the valley to Chichicaste pottery.

Punctuated and incised ceramics dominate the pottery assemblage of northeastern Honduras beginning around 600-700 AD (Healy 1993). However, the characteristic ceramic types of northeastern Honduras were not recovered in the Jamastrán Valley. We did recover incised pottery (comprising 1% of the total count of ceramics) in several settlements in the valley, but they show similarities with types from northern Nicaragua (Guiguilisca Inciso, dated to between 600-800 AD) rather than with any other incised types from eastern Honduras. Our analysis suggests that the punctuated and incised sherds recovered in Jamastrán are of local manufacture.

Settlement	Mean Population Size	Foreign	%	Local	%	Total
10	530	308	44.9	377	55.1	685
4	388	248	50.8	240	49.2	488
8	301	99	24.6	303	75.4	402
12	273	38	10.8	313	89.2	351
3	142	52	28.6	130	71.4	182
9	125	13	7.8	152	92.2	165
14	114	65	45.7	77	54.3	142
1	85	5	4.4	110	95.6	115
15	53	4	5.8	64	94.2	68
7	49	6	9.1	60	90.9	66
11	42	28	51.8	26	48.2	54
13	32	27	54.0	23	46.0	50
6	30	3	6.3	45	93.7	48
5	26			35	100.0	35
23	24	9	30.0	21	70.0	30
17	16			24	100.0	24
18	16	1	4.7	20	95.3	21
21	16	1	4.5	21	95.5	22
24	16			26	100.0	26
22	15	2	8.7	21	91.3	23
26	15	1	4.4	22	95.6	23
29	13	2	9.5	19	9.5	21
20	12	1	5.3	18	94.7	19
27	11			18	100	18
2	11	2	11.1	16	88.8	18
30	11	4	18.2	18	81.8	22
16	10	3	14.3	18	85.7	21
25	8	1	5.0	19	95.0	20
28	6			17	100.0	17
19	4			12	100.0	12
		923	**29%**	**2265**	**71%**	**3188**

Table 6.1 Imported and Local Ceramic

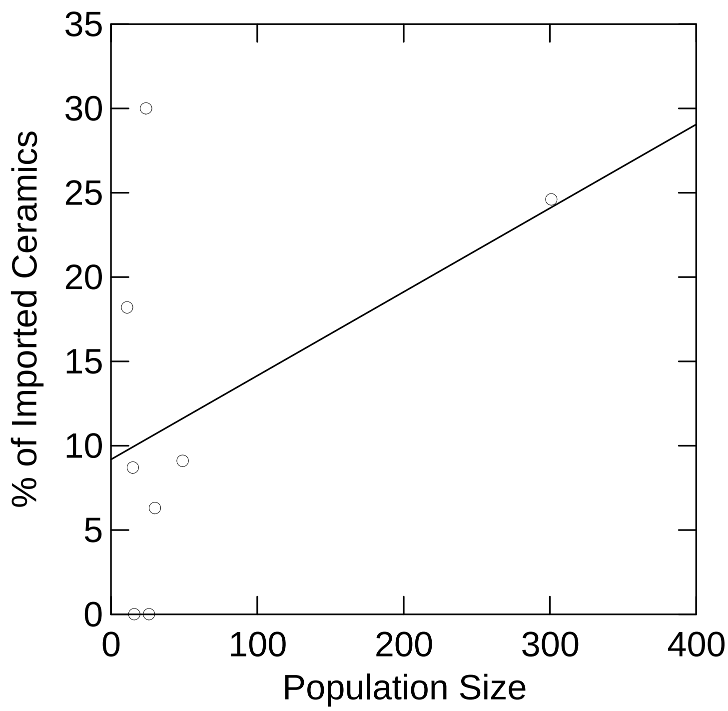

Figure 6.1 Imported Ceramics and Settlement Sizes

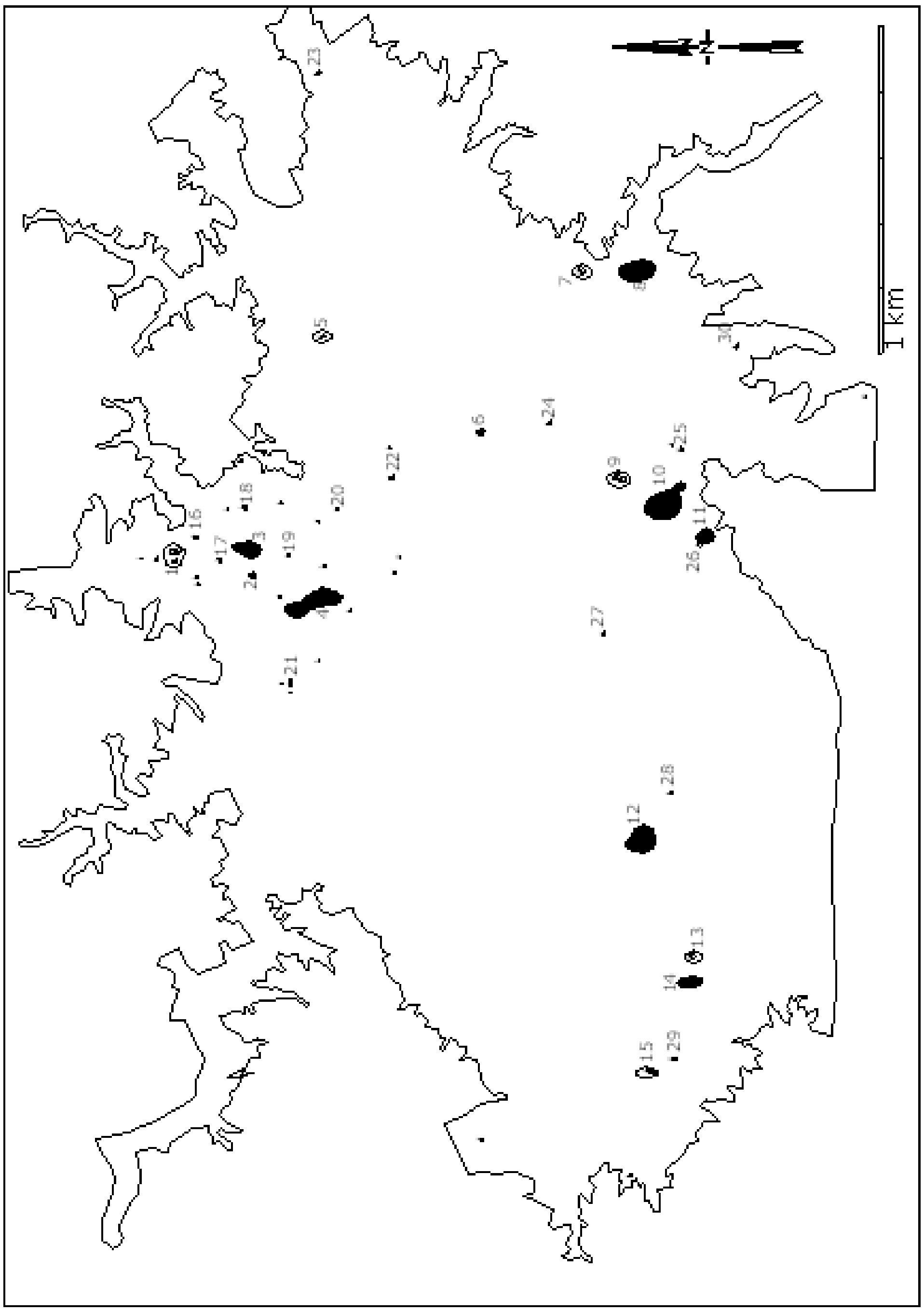

Figure 6.2 Communities with More than 25% of Imported Ceramics (see Table 6.1)

Calpules Regional Cluster		
Settlements	% Imported Ceramics	Population Size
4	50.8	388
3	28.6	142
1	4.4	85
17	0.0	16
18	4.7	16
21	4.5	16
20	5.3	12
2	11	11
16	14.3	10
19	0.0	4

El Zapotillo Regional Cluster		
Settlements	% Imported Ceramics	Population Size
10	44.9	530
9	7.8	125
11	51.8	42
26	4.4	15
25	19.0	8

Southwestern Area		
Settlements	% Imported Ceramics	Population Size
12	10.8	273
14	45.7	114
15	5.8	53
13	54.0	32
29	9.5	13
28	0.0	6

Eastern Area		
Settlements	% Imported Ceramics	Population Size
8	24.6	301
7	9.1	49
6	6.3	30
5	0.0	26
23	30	24
24	0	16
22	8.7	15
30	18.2	11

Table 6.2 Imported Ceramics by Regional Clusters and Areas of the Jamastrán Valley

7. Conclusions

Different lines of evidence suggest that the prehispanic Jamastrán Valley in southeastern Honduras was not politically unified during the period under study (600-1000 AD). At the regional level, the communities in the valley were politically autonomous and economically independent. The presence of discrete areas of closer interaction is taken to represent internal interactional boundaries in the valley. Regional clusters in Jamastrán consist of areas where communication and exchanges among communities were closer and more frequent than with other similar interacting areas in the valley. The presence of larger community structures seems to represent the existence of at least two autonomous systems in Jamastrán. Within the regional clusters population tended to congregate in one village, which hosted a significantly larger population than the other communities integrating the clusters. It is likely that these regional clusters might correspond to more integrated social units in the Valley. At this scale, social and economic interdependence could have been established between communities with little social differences.

7.1. Access to Agricultural Land

Modern and ancient agriculturalists in different areas of Honduras have favored to settle along rivers and within the tropical deciduous forest areas because of higher soil productivity and availability of wild resources in those environments. This selection allows maximum resource utilization providing access to fertile soils for agriculture as well as continuing productivity from fruit trees (Lentz 1989:71). Prehispanic settlers in El Cajón region preferred site locations on or near the alluvial *vegas* (Hasemann 1987, 1998) due to the advantages of the proximity to the best agricultural land in the region. Due to technological constraints, the prehispanic inhabitants of El Cajón relied less on extensive slash and burn cultivation and more on continuous cultivation of smaller agricultural clearings (Locker 1989:163). It is likely that agriculturalists in the Jamastrán Valley also relied on this strategy in order to maximize the use of lands with higher agricultural potential and to benefit from other natural resources. The dispersed nature of the communities in Jamastrán suggests that households kept *milpas* or kitchen gardens adjacent to their dwellings and exploited larger catchment areas to diversify their diet and obtain other resources. Intensive agricultural practices (intercropping and/or multicropping) are likely to have occurred in the context of kitchen gardens and less intensively in larger fields away from the domestic residences.

A similar location pattern has been observed in the Culmí Valley and along the Rio Talgua in eastern Honduras. In those regions, settlements along the rivers tended to be located on higher terraces where the terrace was narrow, but close to an area where it widened (Hasemann 1995:10, Begley 1999:197). It has been pointed out that in these areas of eastern Honduras the location of dwellings in narrow areas freed the wider terraces for agricultural activities, suggesting that at least some agricultural plots were located in the vicinity of the households. Additionally, this pattern seems to be related to early stages of colonization during which settlements are initially located on prime agricultural land, within the circum-riverine and deciduous forest environmental zones. Control over the best agricultural lands is not likely to be present at early stages of land colonization or under conditions of land abundance and/or greater resource diversity (Pope 1987). Our data from the Jamastrán Valley suggests that the settlement distribution in the region might represent the expression of early stages of agricultural colonization, when access to prime agricultural land might have been favored but control over this resource was not critical for a small population.

In the El Cajón region, where agricultural land was limited, competition over primary agricultural land became apparent through changes in settlement patterns in the region as population grew and the larger settlements began to absorb smaller and more recent settlements (Hasemann 1998). In this case, a dynamic similar to that of the ¨founder effect model¨ (McAnany 1993) seems to have taken place in the El Cajón; that is, the oldest settlements located on the best agricultural land will establish a monopoly on the most productive land and, as population grows, assimilate newly arrived settlers. Even under this scenario of competition and monopoly of the most desirable agricultural land, carrying capacities in the El Cajón region were not exceeded at any point during its occupation, and control over this basic resource has not been directly linked to the emergence of social complexity in the region. Access to agricultural land and permanent water resources seem to have been determinant factors in the selection of settlement location in ancient Honduras. In fact, some of the main centers of primate settlement systems (Yarumela, Salitrón Viejo and Los Naranjos, in central Honduras) were located close to those resources; however, this favored settlement location, and the assumed control over prime agricultural land associated to it, cannot explain by itself the development of social hierarchies in those regions (Dixon 1989, Hirth 1984, Hasemman 1987, 1998) or in areas of northeast and eastern Honduras (Healy 1978, Begley 1999).

7.2. Craft Production and Local Exchange

Evidence derived from the analysis of the agricultural productivity (annual yield production) of the hypothetical catchment areas and the population sizes of each social unit in Jamastrán suggests that communities in the valley were inhabited predominantly by food-producers. This observation is reinforced by the scanty evidence of craft specialization found in the valley. Communities in Jamastrán were self-sufficient in terms of production of lithic tools for their agricultural, and other subsistence, activities. High proportions of basic chipped stone tools in relation to total presence of artifacts (i.e. proportions of ceramics) among smaller settlements in the valley also suggests that agricultural activities were predominant and occupied most of the time of the inhabitants in the valley. At the same time, it also indicates slight differences among communities in regard to concentration on economic activities in the valley. Our research suggests that some communities (households within them) specialized, most likely on a part-time basis or occasionally, in the production of prismatic blades. These patterns suggest that all communities in the valley produced their basic lithic tools whereas only some of them were familiar with obsidian core-blade techniques. Our data also indicates that the larger villages within the regional clusters were engaged in all steps of blade production, while smaller settlements seem to have concentrated on the finishing steps of blade production. All blades produced in the valley were manufacture with obsidian from the La Esperanza source, from western Honduras. It is probable that larger villages in Jamastrán had more direct or frequent access to obsidian from La Esperanza.

Due to the relative closeness of the Jamastrán Valley to the Güinope obsidian source, we had originally assumed that Güinope obsidian will be the predominant source for tool making in the region; however, our analysis shows that most of the obsidian (58%) came from an unknown source, followed by obsidian from La Esperanza (32%), whereas Güinope only makes up 10% of the obsidian recovered in the survey. Although the percentages vary by regional cluster and by area in the valley, the occurrence of obsidian also indicates that Güinope was the least used source within more spatially discrete areas in the valley. Obsidian from Güinope was more frequently used among communities in the southwestern part of the valley. However, 58% of the Güinope obsidian recovered during the survey comes from the main village in the Calpules regional cluster, which concentrated 56% of the cluster´s population. Research at the Dos Quebradas archaeological site in Olancho has also challenged the assumption that the Güinope source would be more frequently used in areas of eastern Honduras. Winemiller and Ochoa-Winemiller (2009:8) explain that that their recent work in Dos Quebradas, 600-1000 AD, yielded obsidian artifacts from El Chayal (77%), Ixtepeque (22%), La Esperanza (0.1%), and Pachuca (0.3%). While this collection is characterized as typical for prehispanic Honduras, they point out that ¨the notable absence of Güinope, the nearest source to Dos Quebradas and Chichicaste, is puzzling¨ (Winemiller and Ochoa-Winemiller 2009: 8). Obsidian for Güinope has been recovered from other areas in eastern Honduras; however, obsidian in general is a scarce commodity in the archaeological record of eastern Honduras (Begley 1999:224). In the northeast, obsidian has been reported from the site of Selin Farm (300-1000 AD) and Rio Claro (1000-1530 AD). Two obsidian artifacts from Selin Farm were sourced, one to the Güinope source and the other to the Ixtepeque. The three Rio Claro artifacts were sourced to the La Esperanza source (Healy et al. 1996:277-279).

Obsidian cortex frequencies indicate that the raw material arrived in the valley in rather less processed manner; nodules from the Güinope and unknown sources, core preforms from the unknown source, and most likely polyhedral cores from La Esperanza. Based on the assumptions behind cortex frequencies, we have considered that the unknown obsidian source predominant in the Jamastrán Valley might be located relatively close to the valley. However, it is clear that closeness to an obsidian source does not guarantee its presence or relative importance for tool making. Our data from Jamastrán suggests that a more distant source, La Esperanza, was preferred for blade production, probably due to its high quality and nodule size. The distribution of La Esperanza obsidian and the evidence from prismatic blade production in the valley suggests that the larger settlements in each regional cluster engaged in all the steps of blade production while smaller settlements within the clusters concentrated on tool finishing. Our data suggests that the main village in the El Zapotillo cluster might have had more direct access to obsidian procurement networks for blade production. Due to more access to polyhedral cores for blade production, some households in this village might have been involved, albeit indirectly, in some steps in the production of prismatic blades more than other households within the community and El Zapotillo regional cluster were. Under this scenario, it is likely that households with access to polyhedral cores might have been redistributing blade blanks to other households.

Our analysis points out the need to differentiate prismatic blade production from other forms of obsidian tool making in the Jamastrán Valley. While the production of prismatic blades and points is restricted to nine settlements, obsidian debitage is found in every community in the valley. In areas of western and central Honduras, prismatic blade production and consumption seems to have been more commonplace than in Jamastrán. In the Naco Valley, polyhedral cores were imported to centers through alliance networks and then redistributed to consumers who manufactured their own blades (Ross 1997). Ross (1997) as well as Schortman and Urban (1994) indicate that low levels of craft specialization were involved in blade production; moreover, all the inhabitants of the Naco Valley had relatively equal access to blades. Ross (1997) indicates that the Naco elites did not monopolize obsidian or distribute it as a prestige good. However, elites had some involvement in the redistribution of obsidian cores and blades despite no overt control. In the El Cajón region, evidence from blade production has been discussed from the three larger sites in the area (Hirth 1988:306-307,316-319) without any explicit indication of elite control over this kind of production. Source analysis of 123 obsidian artifacts from the Late Classic (around 700-900 AD) indicates the presence of three obsidian sources in the El Cajón collection; most of the obsidian came from La Esperanza (39.9%), which was also heavily exploited during the previous period. The other sources were Ixtepeque (27.6%), Güinope (24.4%) and Chayal (.8%). Hirth (1988:317) indicates that the demand for Ixtepeque obsidian was a result of the form in which it moved; that is, obsidian from Ixtepeque arrived in central Honduras as finished polyhedral cores, whereas the material from the Honduran sources frequently moved as unworked or partially worked nodules. 75% of the analyzed prismatic blades from the El Cajón region were from the Guatemalan sources with the reminder coming from La Esperanza.

Prismatic blades recovered in the El Cajón region were struck from polyhedral cores processed outside of the region (Ixtepeque and La Esperanza), with obsidian reduction restricted to freehand percussion of small nodules from the La Esperanza and Güinope sources. In the Jamastrán Valley, on the other hand, obsidian from La Esperanza is seen to have moved and arrived into the region in the same way as the Ixtepeque obsidian did in central Honduras, whereas Güinope and the unknown source were used for hand percussion and were mobilized in a less processed manner. Hirth (1988:317-318) points out that the three main villages from the region had access to the same obsidian sources, however, significant variation is found in the proportion of particular sources represented at each site.

A pattern of differential proportions of obsidian sources is also observed in the Jamastrán Valley, with the exception that in Jamastrán the same obsidian source was always used for blade production. Hirth (1988: 319) observes that the variability in the obsidian assemblages of the El Cajón region corresponds to what would be expected by the ¨simultaneous operation of several independent but overlapping procurement systems.¨ Hirth (1988:319) also points out that heterogeneous procurement patters can be expected when independent socioeconomic systems operate simultaneously within a region. Similarly, our data from the Jamastrán valley suggests that the variability in the proportion of different obsidian sources and uses for particular tool making might be due to the presence of independent but overlapping procurement strategies. A centralized or monopolistic control over the procurement, production and distribution of obsidian would result in less variability in the form in which obsidian moved throughout a region (Hirth 2002:9). In Jamastrán, obsidian arrived in the form of nodules, macrocores, and polyhedral cores depending on the distance and availability of the obsidian sources. With the exception of obsidian from the La Esperanza source and its subsequent use for blade production, our data suggests that obsidian procurement, distribution and production were accessible to all communities in the Jamastrán Valley.

Evidence of pottery production in the Jamastrán Valley comes from the actual sherds recovered during our survey. We found no evidence of kilns, kiln wasters or pottery production tools in the region. Pottery production most likely took place at the household level with little specialization. In other regions of Honduras, pottery production had a more salient economic role. In contrast to the production of obsidian tools in the Naco Valley, pottery production seems to have been more closely directed by the elites of the primate center of the Valley (Schortman et al. 1992). Evidence within the core of La Sierra site suggests that significant elite control and centralization of craft production took place during the Late Classic (600-950 AD). The presence of kilns and other evidence of craft production associated with ceramic containers, textile manufacture, and marine shell working appeared to have been controlled by the local elites. A similar situation has been reported for El Cajón region where pottery production was an important activity since its early occupation. The Early Sulaco Phase (400-600 AD) sees the development of Salitrón Viejo as the main community in the region. This period is also characterized by the appearance of The Sulaco Ceramic Group, which is a ceramic marked for ancient Honduras and neighboring countries. The recovery of kiln wasters indicates that the Sulaco Group ceramics were locally manufactured and incorporated in to a wide network of exchange with other communities in central, western and eastern Honduras and Nicaragua (Hirth et al. 1989, Salgado 1996). The precise link between elite involvement in craft production and/or sponsorship of interregional trade, and the implications for the development of social hierarchies in the region remains to be explained.

7.3. Interregional Interaction

Nineteenth and early twentieth century ethnographies indicate that populations in eastern Honduras clear the forest, with the exception of desired trees, along navigable rivers not only because the soils there were more fertile, but also because the location provided access to river transport routes (Conzemius 1930:60). In central and western Honduras the reconstruction of trade networks has been supported by the presence of natural features in the landscape, particularly rivers. The extensive stream systems that traverse most of Honduras have been considered important communication routes in ancient Honduras (Hasemann 1998, Joyce 1985, 1986, 1991). The Jamastrán Valley is watered by the Guayambre Drainage, which has its headwaters in the Montaña de Potrerillos and to the west of Apali (Rio Apali, just south of the survey area) in Montaña de las Nubes on the border with Nicaragua. The Guayambre river flows north-east joining the Guayape River and forming the Patuca River, the second largest river in the country, which crosses eastern Honduras connecting the Jamastrán Valley with Olancho, including the Telica Valley where Dos Quebradas and Chichicaste are located. To the east, the Jamastrán Valley neighbors part of north-central Nicaragua.

Ceramic evidence from Jamastrán indicates that the inhabitants of the valley were involved in interactions with communities in the Telica Valley in Olancho. Analysis of the Chichicaste sherds recovered from the survey indicates that larger villages tend to have more imported ceramics than smaller ones; however, some smaller settlements also show high proportions of imported pottery. The distribution of Chichicaste pottery varies depending on the regional clusters and areas of the valley. Whereas Calpules and El Zapotillo regional clusters yielded higher proportions of imported ceramics (34% and 38% respectively), the communities in the southwestern and eastern part of the Jamastrán yielded roughly half of that (15% and 13%). We consider that differential distributions of imported ceramics in the valley indicate differential access to external interactions and exchanges. As with the mobilization of obsidian, it is likely that the varied distribution of Chichicaste pottery in the valley could be the result of a combination of procurement strategies in the valley, acting independently but operating simultaneously in the region. Looking at the regional centers, the main village in the El Calpules area yielded considerably higher proportions of imported ceramics than any other community within the regional cluster.

It has been pointed out that in both northeastern and eastern Honduras no great amount of commodities was mobilized through intereregional exchanges with west central Honduras (Healy 1992, Begley 1999). It has been also suggested that in northeastern Honduras, as in Olancho, interregional commodity exchange with societies in west central Honduras was not a determinant factor in the development of sociopolitical complexity in the region. For Healy (1984, 1992:102) the period of greatest political and social complexity in the northeast occurs by 1000 AD, when societies in northeast Honduras have become increasingly isolated from the chiefdoms in central and western Honduras, and commenced contacts with Lower Central American groups. However, Healy (1992) does not attribute the emergence of more complex forms of social organization in northeastern Honduras to increasing interaction with Lower Central America, at a time when most regions in Honduras are going through processes of political an economic decentralization. Interaction with elite groups from other areas of Central America seems to have strengthened when social differences were already present in northeastern Honduras. Begley (1999) also supports the idea that interregional economic exchange was not a predominant form of interaction among eastern and central Honduras. For Begley (1999), non-economic interactions appeared to have played an important role in the socio political organization in the Culmí Valley, where the adoption of ballcourts and related rituals by the emerging elites in the region correspond to a strategy to reinforced local authority.

Archaeological research in Dos Quebradas and Chichicaste points to a greater degree of commodity exchange with western and central Honduras than what has been observed for other areas of eastern Honduras. Research in the Telica Valley suggests that obsidian was an important commodity in the region, and that the inhabitants of Dos Quebradas had access to obsidian from distant sources from western Honduras, Guatemala and the Central Mexican Highlands. In central Honduras, access to obsidian from Guatemala and Mexico was apparently obtained indirectly through trade contacts with Copán (Hirth 1988: 307). It is likely that Dos Quebradas obtained obsidian from diverse sources though exchange networks with communities from central Honduras. More research in the Telica Valley will help us understand the obsidian procurement strategies in Olancho and the Jamastrán. Research at Dos Quebradas has not emphasized the role of interregional interactions in terms of contributing to social complexity in the region (Winemiller and Ochoa Winemiller 2009). More research in the Telica Valley will also contribute to our understanding of the role of craft production and elite involvement in its distribution. Our data from the Jamastrán Valley suggests that interaction with that region was direct and apparently constant.

7.4. Social Trajectories in Western, Central and Eastern Honduras

Sedentary communities were established throughout western and central Honduras between 1000 and 800 BC. Between 400 BC and 250 AD, in some of these regions (Comayagua Valley, Sula Valley, Naco Valley and the Lake Yojoa area) emerging elites were able to mobilize labor and resources that enabled the construction of large-scale public works. The distribution of similar ceramics, and obsidian, suggest a pattern of interregional contact in which interaction was not restricted to particular areas of west-central Honduras (Schortman and Urban 1991). In fact, the early central places of western and central Honduras were part of a wide exchange network indirectly linked to western El Salvador and the Maya Highlands. With the probable exception of Los Naranjos, regional centers in the Comayagua and Naco Valleys were abandoned or lost their political prominence between 250 and 600 AD, a period during which west-central Honduras experienced a process of political and social reorganization. New centers emerged or consolidated their political status; such is the case of Salitrón Viejo in the Sulaco Valley (El Cajón Region), which would become the center of an extensive political unit during the Late Classic (Hirth et al. 1989). Schortman and Urban (2004: 328-329) have pointed out that during the Early Classic (250-600 AD) intersocietal exchanges in prehispanic west-central Honduras are characterized by the emergence of two interaction networks: one involving a wide range of people (exchanging fancy pottery and other goods) and another restricted to ¨magnates¨ who dealt with explicit material expressions of hierarchy (such as jade and stucco decorations). Evidence from Copán and Salitrón Viejo suggests that highly valued imports were expressions of the elite´s external contacts and the prestige derived from such interactions rather than economic supports for elite pretensions (Schortman and Urban 2004:331).

After 500 AD west-central Honduran societies experienced a marked increase in population growth, political expansion and consolidation of intricate exchange networks. These societies, although with differing degrees of political centralization and supra-regional influence, were able to establish very stable hierarchical relationships until about 800-900 AD, after which there was political decentralization and reorganization of social, economic and political arenas throughout the region. Further research would have to explore the larger impact of the demise of the Copán dynasty, and its subsequent effect on economic, political and social networks, in neighboring regions as the archaeological record of west-central Honduras indicates the abandonment or decline of important centers (i.e Salitrón Viejo in the Sulaco Valley, Gualjoquito in the Middle Ulúa Drainage, La Sierra in the Naco Valley) during the ninth and tenth centuries in association to the political crisis in Copán.

In contrast to the early establishment of agricultural communities in western and central Honduras, sedentary occupation in eastern Honduras is identified in the archaeological record of different valleys at around 300-600 AD. While the emergent central places in northeastern Honduras and the Culmí Valley participated in a rather marginal manner in the well-established commodity exchange networks of western and central Honduras, emergent centers in the Telica Valley seem to have been more directly involved in those networks. Our current data does not support the idea that interregional interactions between nascent hierarchical communities in the Telica Valley and well established chiefdoms from west-central Honduras provided the basis for the formation of social complexity in areas of eastern Honduras. However, the disruption of exchange networks in west-central Honduras, due to political changes, might have had an impact in the local social dynamics of the Telica Valley and other areas in eastern Honduras including the Jamastrán Valley. It is likely that processes of sociopolitical decentralization observed in areas of west-central Honduras at around 800-1000 AD affected the economic and political landscape of areas in eastern Honduras where interregional contact was more constant and direct. The abandonment of centers in the Telica Valley and the Jamastrán Valley might be related to a more generalized process of economic segmentation and population dispersion linked to pan-regional socio-political rearrangements. On the other hand, this political crisis in west-central Honduras had a minimal impact on northeastern Honduras, where communities maintained a marginal interaction with west-central polities.

As pointed out in Chapter 1, evidence derived from the comparison of different social trajectories in regions of western, central, and eastern Honduras, points to three common factors that stand out as crucial elements for understanding the development of social hierarchies in those regions; access to prime agricultural land, craft production and local exchange and interregional interactions. It is impossible to single out a sole determining factor responsible for the establishment of institutionalized social differences for each Honduran region. Moreover, it is the articulation or combination of these factors and the ability to connect economic and prestige strategies to each other that enable the consolidation of permanent forms of social inequality in many regions of prehispanic Honduras, including the Culmí and Telica valleys and northeastern Honduras, despite different degrees of political centralization. What differentiates the emergence and consolidation of social hierarchies from the trajectories of west-central and eastern Honduras is the pacing of social change.

More than fundamental differences in the social processes leading to social complexity in prehispanic Honduras, comparison of different trajectories seem to indicate that time depth and the pace of social change in each region can better account for the successful establishment of varying forms of political centralization. The synchronic nature of our data, and subsequent analysis, from the Jamastrán Valley does not allow us to grasp the nuances of social change observed in other social trajectories, instead we have provided here a rather ¨ethnographic¨ view of Jamastrán and contextualized it within a larger region. The late occupation of the Jamastrán Valley coincides with other regions in eastern Honduras (the Culmí and Telica valleys, the Talgua Drainage, and northeastern Honduras). Viewed within this larger region as well, the incipient social differences found among communities in the Jamastrán Valley seem to make sense if understood as part of a wider political system, which might have had its center in the Telica Valley. Local aspiring leaders in Jamastrán seem to have failed to articulate in a complementary fashion both economic and prestige-based strategies in order to solidify their social status. The frailty of these hierarchical structures is also reflected in the communities´ inability to resist the pressures toward decentralization and population dispersion experienced throughout prehispanic Honduras.

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