Chapter 1
INTRODUCTION

This book is about the inhabitants of northern Yucatán, México, during the last centuries before the European arrival (1511, the shipwreck of Aguilar). They are part of a people known as the Maya, and the period of study is the Late Postclassic (AD c. 1100-1500). The Europeans arrived only decades after the abandonment of Mayapán, the last Maya capital in this region. The Late Postclassic is then crucial to gain a better understanding of the state of northern Yucatán (Figure 1-1) society at the time of contact and the impact of this contact on the Maya people. Despite extensive ethnohistorical records and current research, the nature of the Late Postclassic Maya society is not well understood, primarily because details of its socio-economic nature still eludes researchers, prompting the proposal of multiple and many times conflicting perspectives about this period.

To gain a better understanding of the social and economic environment in northern Yucatán during the Late Postclassic, this study focuses on ceramic production, a socio-economic aspect of the Maya society. Through a combination of analytical methods that include petrographic, chemical, and surface features analyses, this research reconstructs ceramic production technology and examines regional patterns in this technology for vessels from Mayapán, secondary north-central sites, and eastern sites. These patterns are examined in term of the wider context, including ethnohistorical, ethnographic, and geological to gain a better understanding of ceramic manufacture, production organisation, and networks of interactions, such as ceramic technological traditions and mechanisms of exchange. These are crucial aspects for understanding the socio-economic environment of this society and informing current perspectives about this critical period.

The questions about the socio-economic environment that this study is addressing can be summarised as follows. Were there patterns in raw material selection and ceramic technology that might reflect zones of production, groups of potters, technological traditions, or other social divisions? What might such patterns tell us about the organisation of production and the nature of interactions, such as networks of ceramic exchange and technological traditions that may reflect social divisions or site integration?

New insights have been gained on the manufacture of Late Postclassic ceramics. The ceramics from Mayapán have usually been regarded as of less quality than ceramics from previous periods. However, the results show that the potters who produced these ceramics had a deep working knowledge of the very challenging raw materials available in northern Yucatán.

This study showed that raw material selection is not random and follows patterns determined by overarching technological traditions for different types of vessels at different geographical locations. These traditions can be traced back to, at least, the northern Terminal Classic, and continue up to the present. Furthermore, cultural divisions between Mayapán and minor north-central sites are reflected in the data.

At least two orientations to production are emerging. The association between raw materials and types of vessels at Mayapán differs from minor north-central sites. In addition, many potters' groups may have supplied the minor north-central centres, contrasting with the compositional and technological homogeneity of Mayapán pottery. Divisions in ceramic technology are also observed between vessels from north-central sites and vessels from sites further to the east.

New perspectives have been gained on long-standing questions about the location of zones of productions, the extent of the export and import of Mayapán vessels, and the mechanisms of distribution that may have been involved in this movement of vessels. Mayapán imported few vessels and exported many. However, vessels with Mayapán fabric style were found only at studied sites located less than two days' march from this major site. A ritual context or a limited sub-regional market context may explain this movement. These findings have informed current views about Late Postclassic ceramic production and exchange and advanced our understanding of the socio-economic nature of this period.

This chapter introduces the Late Postclassic and the challenges and problems it raises for researchers. It summarises overarching views that have been proposed about the nature of the Late Postclassic. The objectives of this project are presented in detail, and the methodology selected is outlined.

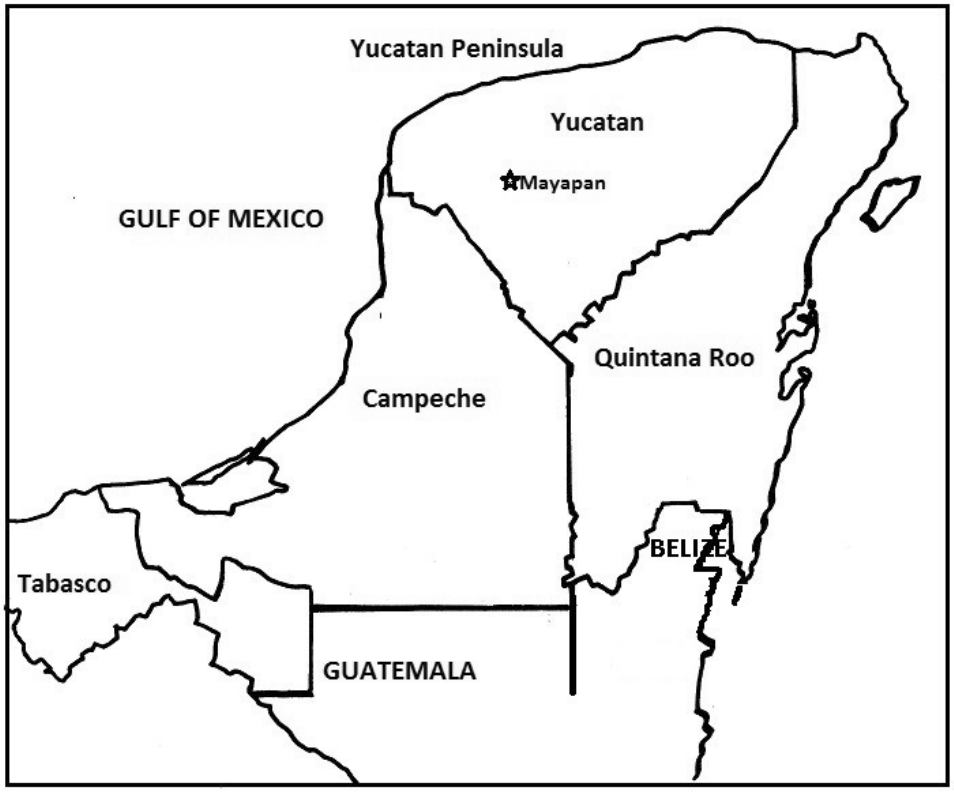

Figure 1-1. Yucatán Peninsula and three main sites (map based on INEGI 2005)

1.1 Brief Introduction to the Late Postclassic in Northern Yucatán

Mayapán (Figure 1-1, Figure 1-2, Figure 1-3) was the largest Maya capital and urban centre during its peak of 250 years (Masson and Peraza 2014, p.1) from AD 1200 to around 1450. During that time, Mayapán was a centre with a political centralisation without rivals in the Maya lowlands (Masson and Peraza Lope 2014). It was a capital uniting much of northern Yucatán in confederacy of territories under its dominion (Roys 1962). It was a walled city, and its size and population were unrivalled reaching a population of 15,000-17,000 and an enclosed area of 450 hectares (Brown 1999; Masson and Peraza Lope 2014, p.266).

Construction at Mayapán may have started as early as AD 1050/1100 (Milbrath and Peraza Lope 2003, p.24), coinciding with the decline of the Terminal Classic (AD 850-1000, from Masson and Peraza Lope 2014, p.63) centre of Chichén Itzá (Peraza Lope et al. 2006) and new political arrangements in northern Yucatán. The founding of Mayapán may have been related to waves of migrations of the Itza (Roys 1962), a Toltec-influenced or hybridised Maya originally from Tabasco (Figure 1-1) that, according to the interpretation of the chronicles (Roys 1962), had entered the peninsula and retreated probably to the Petén after their defeat at Chichén. In a second wave of migration and conquest, they entered the peninsula from the east coast. According to the informants in Landa (1986), the founding of Mayapán resulted from an agreement between the Itza and the different lords of the country to found a new city to which the lords moved and to which all matters of the country were brought. The north-central Yucatán area was governed from Mayapán by this league of lords (Landa 1986; Roys 1962).

Social developments were associated with changes in material culture including changes in architectural design and differences in building construction techniques. Most important for this research, a distinctive red-slipped ceramics appeared fully developed at Mayapán (Smith 1971a) with forms that, up to the current state of research, bear little relation to previous ceramics of the area (Brown 1999); Smith 1971a)These ceramics dominated in all assemblages from inland sites of northern Yucatán (Peraza Lope et al. 2006). They are also found in the eastern coastal area where they are somewhat different in texture and compactness (Brown 1999, p.316; Peraza Lope 1993, p.308; Smith 1971a, p.241).

Mayapán was abandoned around AD 1441-1461 following a rebellion in which the chiefs, thinking that the ruling lineage, Cocom, was getting too close to the Mexicans killed all the members of the Cocom house, except for the now famous son who, according to Landa's (1986) informants who traced their ancestors to Mayapán, was trading in Honduras. After the massacre, the inhabitants of Mayapán abandoned this centre, and the chiefs returned to their towns (Landa 1986).

Figure 1-2. Mayapán (photograph by the author)

Figure 1-3. The observatory of Mayapán (photograph by the author)

Mayapán was the last Maya capital in the lowlands. Until the conquest, no other centre rose to become the new Mayan political centre. The Europeans arrived a few decades after Mayapán was abandoned, marking the start of the conquest and colonisation period.

1.2 Late Postclassic Debates

An eclectic array of perspectives exists aiming to explain the nature of Late Postclassic society. The overarching debate that encompasses these views is whether the socio-economic institutions and organisation of this period represent, paraphrasing Robles Castellanos and Andrews (1985, p.56), a slow disintegration of Maya culture or a refinement of its development.

In the south, during the Classic, the rulers were the living reincarnation of the Maya supernaturals, and political power was transferred through pure blood lines (Friedel 1985, p. 424). In later periods, the north shared the basic cosmology with the Classic south, such as the twin heroes (Friedel 1985, p. 425), but religion affirmed the individual rulers rather than dynasties. There was a change in what Friedel (1985) calls political religion. As a result, royal tombs and temples dedicated to deceased kings were no longer constructed during the Postclassic (Masson and Peraza Lope 2014, p.49), and the institution of priesthood probably took more relevance with the decline of divine kingship (Masson and Peraza lope 2014, p. 53).

During the northern Yucatán Postclassic, the list of new material remains traits at Mayapán is long. Regarding ceramics, there was little continuity with the Terminal Classic ceramics (Brown 1999; Smith 1971a; Willey 1985), except for one ware, Peto Cream Ware, which has been found in Terminal Classic contexts at Chichén (Smith 1971a). Pottery composition was coarser and with fewer components (mostly limestone) when compared with Terminal Classic ceramics (which include volcanic ash, grog, limestone, and clay lumps) at Chichén Itzá or the Puuc area (Pollock 1952, Smith 1971b). Another break is the discontinuity in some architectural aspects between Chichén and Mayapán (Willey 1985, p.38). Masonry is different. Small shrines appeared at Mayapán, while ball courts and bath houses, commonly found at Chichén, disappeared (Willey 1985, p.38). A particular house plan forming a straight-legged C that differed from previous periods is commonly found at Mayapán (Pollock 1952; Willey 1985, p.38). There was also a change in the way of approaching architectural monumentality and the

construction of elaborate objects, for the need for monumental or large-scale construction and elaborate objects decreased.

The rest of this section outlines some of the most influential, and sometimes overlapping, views about the nature of the Late Postclassic. Some of them, like the decadent view, have been fading away but remnants exist. Most of these views argue for a society overwhelmingly dominated by one socio-economic aspect over the others.

1.2.1 The Decadent View

This view of the Postclassic prevailed over most of the 20th century. The alleged decadence had started with the political and demographic collapse that occurred in the southern lowlands around A.D. 700-900; collapse that continued until the conquest. Society had fallen in a state of cultural decay, despondency and carelessness (Pollock 1952, p.24; Roys 1962, p.44-45; Shepard 1964; Willey 1985, p.51). The main symptoms convincing researchers of a 'collapsed' or 'decadent' Maya Late Postclassic included the lack of centralised government at the time of contact (Roys 1957), the perceived low quality of the construction and materials involved, and the small number of sizable ceremonial structures. For instance, Pollock (1952, p.239) commented on the poor structural design of buildings, which might lead to their faster destruction. The smaller size and number of ceremonial structures were attributed to cultural decay (Pollock 1952, p.239-240). In northern Yucatán, the change to a ceramic composition using almost exclusively the most common rock in the region – limestone – has been attributed to the simplification of techniques resulting from cultural decline, carelessness, and lower resourcefulness (Shepard 1964, p.518 - 519).

1.2.2 The Revivalist Views

According to this view, during the northern Late Postclassic, rulers and priests reintroduced some of the Classic and Terminal Classic traditions and monumental structures, particularly those present at Chichén Itzá. Pollock (1952, p.237) suggested that, with this, rulers asserted their political power and reasserted themselves over the foreign practices of the Toltecs (Pollock 1952, p.237). However, there was a selective revival of structures from Chichén Itzá in which, for instance, temples honouring the mythical Cuculcán hero, colonnaded halls, and round temples where adopted while ballcourts and gallery-patio structures were rejected (Masson et al. 2006, Figure 12.3; Willey 1985, p.38). The appropriation of the mythical Cuculcán by the Itza group may have been a legitimisation effort from their part (Masson 2005, p. 260) by associating their lineage to Mayapán's foundational myth. Similarly, the revival of the Classic period stela tradition may have been intended to rewrite history participating in ancient local traditions.

There was also a reversion or revival to some features of the Classic, such as block masonry and corbelled vaults, that were missing during the Late Classic (Andrews IV 1975); features, in particular, observed in buildings (Pendergast 1985, p.240; Pollock 1962, p.240; Roys 1957, p.44). Because of this, the term 'Maya Renaissance' has also been used for the northern Late Postclassic (Andrews IV 1975).

Mayapán is the type site for the Late Postclassic. Elsewhere in Yucatán, and in particular on the east coast, pottery and architectural remains have been found with stylistic and construction methods with affinities to Mayapán (Masson 2015; Pollock 1951, p.239; Sanders 1960, p.228; Smith 1971a). Some researchers consider the Late Postclassic changes so transforming that they have attributed them to a conscious effort to restructure the society as a whole (Robles Castellanos and Andrews 1985, p.90). Others see a gradual change, a process of cultural transformation rather than a break with the past (Milbrath and Peraza Lope 2009), with Willey (1985, p.43) considering Mayapán culture to have been a new synthesis that was essentially Maya.

1.2.3 The Political Economy Views

Political economy commonly refers to studies drawing on economics and political science in explaining how the political environment and the economic system influence each other (Weingast 2008). In Mesoamerican research, political economy is usually associated with the principle of rational choices and maximisation, most often from the part of the elite, but increasingly also from the part of the commoners. Rational choice in political science stands for the application of the economics approach in the study of political phenomena (Lohmann 2013).

The control of the environment through technology and the belief that ancient people used technology in a quest for efficiency or for material's performance are the basis for views known, usually, as the managerial (Wells 2006) or adaptational (Brumfiel and Earle 1987) models. In these models, the elite organise and mobilise labour and resources to take advantage of the environment or to avoid famine and other societal failures.

The financial (Wells 2006), also known as political (Brumfiel and Earle 1987), framework also emphasises the elite and rulers as organisational agents. Elites manipulated ideological, political, economic, or other aspects of society to create, maintain, or increase the inequality that defines the existence of an elite class (Brumfiel and Earle 1987; Wells 2006). The elite and rulers control economic activities, such as long-distance trade and the flow of goods, artefacts needed for ritual activities, luxury and prestige items, or food to extend their power.

Mercantilist or commercial development models (Brumfiel and Earle 1987) of ancient Mesoamerica economies emphasise economically rational choices to maximise elite and/or individual gains. These models are usually intertwined with ideas of the rationalist approach and individual agency in which the individuals strive for efficiency, personal gain, and competitiveness (Wells 2006, p.278). These models propose a Maya society engaged in market exchange and 'World-Systems' dynamics, as discussed by Brumfiel and Earle (1987), Kepecs (1999), Rathje (1975) and others.

1.2.4 The Collective Reciprocity View

In this view, society was organised around reciprocal obligations and perceived as a collective enterprise directed by the elites involving the gods, nature, and humanity (Farriss 1992, p.6). Society was organised in interdependent widening networks that incorporated the extended family, through the *cah* (community), *chibal* (patronym group) to the polity and the sacred (Farris 1992, p.6; Restall 1997, p.90; Fernández Tejedo 1990, p.34). Through the extended family, individuals were incorporated into this network and collective enterprise based on reciprocal obligations (Farriss 1992; Fernández Tejedo 1990, p.34; Restall 1997, p.185), such as gift giving.

That many views exist about the organising principles of Late Postclassic society makes evident that current research is recognising the complexity of Late Postclassic society and that several types and levels of socio-economic organisations, exchange, or institutions may have co-existed. The goal has become to determine the relative role that the different political and socio-economic aspects played in the community, while, usually, emphasising a set of factors. The following four models exemplify the variety of perspectives that have been proposed to explain the organising principles and foundations of the Postclassic political economy.

For instance, the power of a polity might have been based not on the domination of territory (Graham 2011, p.34-44). It was based on the control of the rights of what was produced, administered through spheres of tribute obligations, interpersonal relationships, or administrative control centred on a person or group of people (Graham 2011). In this model, spheres of tribute obligations and interpersonal relationships are emphasised, while acknowledging the importance of other economic aspects such as inter and intra-regional exchange. In research at Mayapán, Masson and Peraza Lope (2014) consider that market exchange and craft production with a surplus take a prominent role in the Late Postclassic economy while acknowledging the significance of other aspects such as tribute and gift giving.

Contrasting with perspectives that emphasise the control of tangible wealth and the display of valuables as the source of power, Rice (2009a) proposes that power could have been based on the control of knowledge, in particular, astro-calendrical knowledge from part of the elite. Political power was achieved by the privileged access to production, exchange, and consumption of knowledge (Rice 2009a). Lastly, Friedel (1981) proposed that Maya political economy was based on the control of scheduled, regulated pilgrimages to focal centres and on the control and taxing of the distribution of goods. At the focal centres, periodical festivals and markets were organised and structured by the calendrical nature of rituals. Markets gave elites the opportunity to control and tax the distribution of local and regional goods (Friedel 1981).

1.3 The Problem

Chase (2004, p.118) has said that any economy can be characterised in terms of its production and distribution. The study of craft production and the interdependencies between production, exchange, and distribution are crucial to characterise the socio-economy of a society. Several models have been proposed to explain the organisation of Maya ceramic production; in particular, for the Classic period for which more studies over larger areas exist. In chapter two, current research and models proposed to explain ceramic production, organisation and exchange are summarised and discussed. One of the objectives of the current research is to evaluate how the results emerging from this study fit these models. Despite the extent of research and multiple proposed models, the study of the ceramic production, organisation, and exchange in Late Postclassic Yucatán has had many challenges, and it is still unclear.

One of these challenges results from the stylistic similarity of ceramics throughout northern Yucatán. When compared to the previous period, the Late Postclassic presented a reduced palette of ceramic types (Masson 2001). A ceramic type, in the type:variety ceramic classification commonly used in Mesoamerica, comprises ceramics sharing diagnostic features, including decoration, form, and paste (Sabloff and Smith 1997), while a ceramic group is a broader category comprising types of the same ware with a consistency in the range of form and colour (Sabloff and Smith 1997, p.279; Smith 1971a, p.7). For instance, summaries in Masson (2001, p.172-173) of the slipped sherds at Mayapán show that 92 per cent of them are classified in one of the ceramic types, the Mama Red type. Contrastingly, at Altar de Sacrificios during the Late Classic, the slipped ceramic type with the highest frequency represents 40 per cent of the total.

In addition, within a ceramic type, each of the vessel forms and its surface finish, decoration, style, and macroscopic paste composition are highly similar from site to site, in particular from north-central Yucatán to Quintana Roo (Masson 2001, p.161), with affinities to

Mayapán. Similarities to those at Mayapán spread over large areas of the Yucatán Peninsula including current-day Belize, Yucatán, and Quintana Roo states (Pendergast 1985, p.240; West 2002, p.178; Rathje 1975; Sabloff and Freidel 1975). However, only a few studies have attempted to measure the observed uniformity of Late Postclassic ceramics (Brown 1999, 2015; Howie, Aimers, and Graham 2014; Masson 2001; Masson and Rosenswig 2005).

Composition, as seen in hand specimens, also appears very homogeneous (Smith 1971a). For instance, red-slipped ceramics commonly found at any of the north-central sites (chapter three) cannot be distinguished from site to site. In light of this uniformity, it is not known whether Mama pots (described in chapter three) were produced at one or several production centres. Therefore, it is not known if paste similarities result from local production under common choices of materials, from a high degree of economic integration between centres with production and distribution from a few of them, or from a lack of geological diversity. The same can be said about the unslipped ceramics commonly found in this area. There is variation, however, on the texture of the paste of most sherds from north-central sites, when compared to sherds from eastern coastal sites. At the coast, red-slipped ceramics with a finer and compacted paste dominate, that nevertheless present stylistic similarities to the north-central red-slipped ceramics. This similarity in the ceramics, combined with the challenges of a mostly geologically homogeneous northern Yucatán, has hindered research on ceramic production, organisation, and exchange.

Some researchers (Howie 2012; López Varela et al. 2001) have argued that in Maya archaeology, this situation will not change and little will be known about production organisation until ceramic production is studied in term of technological choices and techniques applied in the construction of pottery. The way ceramic products are made results from choices and actions made by potters during the selection and processing of raw materials, and during forming, finishing, and firing of the pots.

How can this help the understanding of ceramic production and organisation, and Late Postclassic socio-economic organisation? Pottery reflects the choices and actions made by artisans with regard to materials, the techniques applied, and the sequence of steps followed for the construction of the product. There is a growing body of literature supporting the notion that these choices are modulated by the wider cultural, symbolic, economic, and political environment surrounding the artisans (Dobres 2010; Lemonnier 1993, p.3; Gosselain 2000, Jordan 2015, p.67; Sillar and Tite 2000). Therefore, differences in the wider environmental and social context are reflected in differences in the choices made by potters. These, in turn, may result in similarities and dissimilarities in the way pottery is made, or technological variations in the pottery produced.

The study of how ceramics were made, the choices made from the raw materials that may have been available to potters (chapter four), and variations in technology have, as a result, an archaeological value for they may point to divisions within the potters' environment including socio-economic context, technological traditions, or production groups and zones (Roux and Courty 2005, p.202). These groups and zones of production may have implications for understanding ceramic manufacture, organisation, and exchange. Chapter five lays out the methods designed to gather the data needed to test the hypotheses and achieve the objectives of this research. The chapter addresses the *chaine opératoire*, the theoretical basis for the methodology, and the reconstruction of pottery production. The sampling strategy and samples taken are discussed as well as the analytical methods used, mainly hand-specimen and thin-section petrographic analyses, and chemical analysis. The study of technology is then used to investigate the Late Postclassic socio-economic environment.

More scientific studies are needed in which, for one, the variability in the ceramic composition and manufacturing techniques over large areas of northern Yucatán are compared, and second, these variations are seen from the context of potters' choices for the construction of the pots. Current ceramic research for the Late Postclassic of northern Yucatán, with few but significant exceptions (Kepecs 1999; Cecil 2012), has been overwhelmingly typological or stylistic in nature based on macroscopic examination (Brown 1999, Cruz Alvarado 2012, Ochoa Rodríguez 2004, Peraza Lope 1993), or at the site level (Masson and Peraza 2014, Sánchez Fortoul 2009, 2013). It has therefore not been possible to assess ceramic variability and address questions of ceramic distribution and exchange. As a result of this gap, research has not been able to address basic questions of intra- and inter-site variations in composition, number and location of ceramic work groups, zones of raw material procurement, manufacturing technologies, and common choices or technological traditions. Basic scientific research through a methodology that combines analytical techniques such as petrographic (chapters six and eight), chemical (chapter seven), and surface feature analyses (chapter nine) to examine the variability in ceramic composition and manufacturing choices and technology (chapter nine) can overcome many of the challenges that studies of the Late Postclassic have traditionally faced. This will pave the way to addressing questions dealing with the wider Late Postclassic context such as the existence and scope of technological traditions (chapter 10), organisation of production (chapter 10), and distribution or exchange (chapter 10), as well as the role of Mayapán in the overall Late Postclassic Yucatecan society (chapter 11).

1.4 The Objectives of the Research

In light of the significant role of pottery in the ancient Maya socio-economy and the many questions that remain about ceramic production traditions and networks of interaction and exchange, this research is aimed at investigating the following research questions:

1. Are there sufficiently varied patterns in raw material selection and ceramic attributes or characteristics to allow the characterisation of pottery fabrics into fabric classes and distinct technological classes? This first and most basic question needs to be addressed.
2. What might such technological patterns tell us about how the different classes of pottery (such as with different surface finish or forms) were made?
3. Are the observed homogenisation of style and macroscopic composition maintained through different levels of analysis, e.g. microscopic composition and chemical analysis? Do the observed homogenisation of style and macroscopic composition reflect a shared technological tradition? For instance, a technological tradition defined by a shared understanding of how red-slipped Mama vessels should be made.
4. What might such technological patterns and traditions say about the organisation of pottery production, such as number and location of potters groups, or associations with and between geographical areas or specific sites, and its social significance?
5. What might such patterns and organisation of pottery production tell us about the distribution of utilitarian ceramics and the types of exchange that may have taken place? In particular, were ceramics produced at each centre? Alternatively, was production centralised and, if so, where?
6. How are the results of this research informing current models for the organisation of Late Postclassic ceramic production, distribution, and exchange?

Crucial to addressing the social and economic nature of the Late Postclassic and informing current models is determining the role of Mayapán, the northern capital, in the regional socio-economic sphere. Equally important is the understanding of the role of the minor or peripheral communities in the socio-economic environment, including the nature of their interactions amongst themselves and with Mayapán. For instance, did Mayapán provide ceramics to the lesser centres? Different models explaining aspects of ceramic production, organisation, and exchange for the Late Postclassic have been proposed. They are presented in chapter two. In the concluding chapter of this book, the patterns observed in this study concerning the organisation, traditions, distribution of ceramics, and types of exchange are examined in relation to these models.

Based on observations from a preliminary survey of a fraction of the hand-specimen samples, which indicated that patterned differences in the compositions of slipped and unslipped samples may exist in the data, three hypotheses were proposed as a guide to addressing the research questions. The patterns observed in the preliminary survey (section 5.5 and chapter six) are:

1. In the north-central area, the macroscopic composition of red-slipped samples appears more uniform throughout the sites than for the unslipped ones.
2. Samples classified as Payil, the eastern group of red-slipped ceramics commonly found at eastern sites, and also found at Mayapán, have similarities to a few other samples from the north-central sites and could have been locally made.

With these hypotheses, answers are proposed to particular cases of the research questions and, therefore, in the process of collecting the data to test them, data addressing the questions are gathered. The hypotheses proposed are presented below. They are examined in greater depth with alternative interpretations in chapter five.

Hypothesis A: Unslipped jars found at the different sites were locally produced at minor centres and Mayapán.

This hypothesis is based on a variety of fabrics observed within the unslipped samples.

Hypothesis B: In the north-central area, red-slipped pots (Mama) were produced at one production locality that supplied the rest of the north-central centres.

The basis for this hypothesis is two compositional groups, one with white limestone and one with dark inclusions, observed within the red-slipped samples.

Hypothesis C: Payil, the fine-grained red-slipped ceramic type commonly found at eastern coastal sites, when found at north-central sites, was locally made.

This hypothesis is based on paste characteristics of samples categorised as Payil and found at Mayapán that have fabrics similar to unslipped samples considered probably to be local to the north-central area.

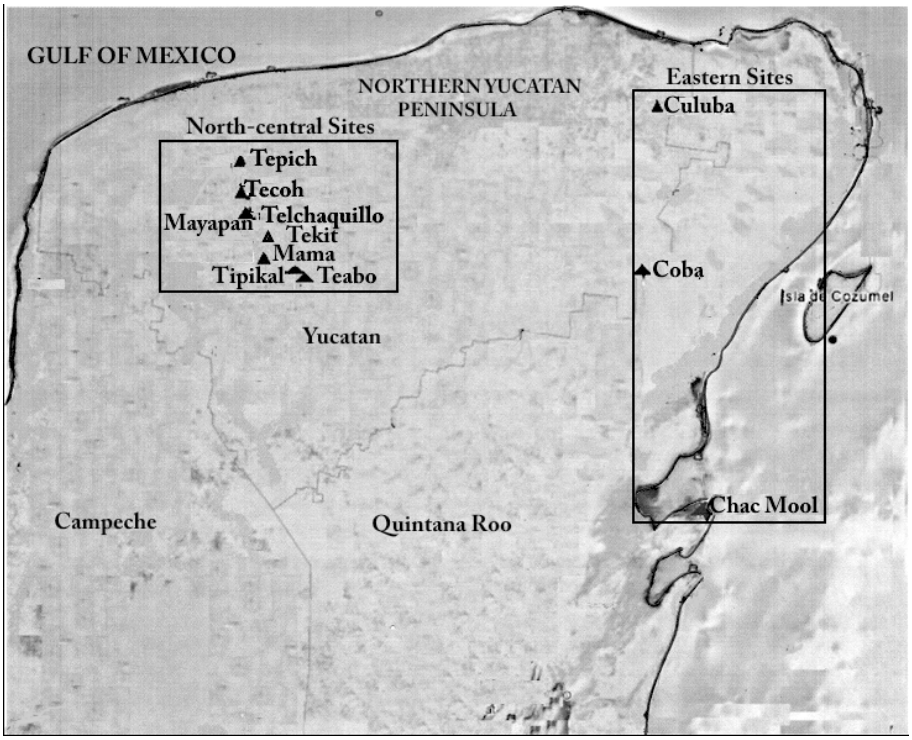

Figure 1-4. Map of studied region with sites in this research

1.5 Outline of the Methodology

The methodology selected to test the hypotheses listed above and to achieve the objectives of this research uses a combination of chemical, petrographic (in hand-specimen and thin-section) and surface feature analyses. These analytical techniques will be used to examine the variability in composition and ceramic manufacturing methods based on pottery samples from Late Postclassic contexts.

Local clays were collected with the objective of evaluating the available raw material resources and, in the absence of direct evidence for ceramic production, seeking clays compositionally comparable to the pottery. The technical attributes are examined as indications of potters' actions and choices embedded in the wider socio-economic environment. Conversely, interpretations given to the raw materials analysis will be based on current knowledge of the environment in which the potters lived. Ethnohistorical accounts complement integral parts of this study, as well as the presentation of the wider environment including the geological setting and current research on the socio-economic environment of the Maya people during the Late Postclassic in northern Yucatán.

The study is structured using a regional approach with two test cases that represent sites from the north-central and eastern areas of the Yucatán Peninsula (Figure 1-4), an area presenting a Mayapán-style ceramic assemblage. Both cases seek to study the characteristics and technological patterns of the local ceramics. The location of the north-central sites, adjacent to the main Late Postclassic centre of Mayapán, provides the opportunity of studying pottery production, distribution, and socio-economic integration between closely located major and minor centres, while the eastern sites address the research questions concerning interaction over longer distances.

Petrographic analysis of samples as found when collected, known as hand specimens (as opposed to, for instance, samples cut into thin sections), was used to divide the samples into broad groups based on characteristics observed at relatively low magnification (chapter six). From these groups, subsets of samples were selected for further chemical and thin-section petrographic analyses.

The chemical analysis used neutron activation analysis (NAA) and multivariate statistical analysis of the chemical compositions of the samples with the aim of characterising the samples into distinct chemical groups. The analysis and resulting chemical groups are presented in chapter seven.

Using petrographic analysis of thin-sections, the samples were grouped by their petrographic characteristics into technological fabric classes. These fabrics are described in chapter eight together with a description of the main inclusions found.

The objectives of this research call for an examination of the analytical results to find patterns in ceramic production. To this end, chapter nine evaluates results from the above analyses, complemented with geological and ethnographic data, to seek compositional and technological patterns. The objective is to draw inferences

about the ceramic techniques that might have been used in the construction of the pottery vessels and about the number of different potters' groups. Chapter 10 further develops the interpretation of technological patterns to determine the existence and scope of technological traditions, the organisation of production, and movement of pots. This study ends (chapter 11) with a discussion of the findings and directions for future research.