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Neolithic Archaeology in Southeast Asia

Introduction

This chapter is a literature review aimed at identifying viable comparative areas and sites for An Sơn and contextualising the neolithic of southern Vietnam. The targeted sites are well-documented and mostly excavated in the last thirty years. Sites near to An Sơn, such as the Đồng Nai Province sites and the Memot sites of Cambodia, for example, reveal interesting parallels with other sites to the north and northwest of the Mekong Delta, and aid in chronological understanding.

A borderless approach to Southeast Asian prehistory is vital and, unfortunately, archaeological research has been restricted by current political boundaries. Much more detail is available for Thailand than for any other country in mainland Southeast Asia. Thailand and northern Vietnam are known to have been of importance in metal age seafaring trade with other parts of Southeast Asia, and some exchange networks may have been established before the iron age. Whether these potential early connections included southern Vietnam or not is contemplated. It is apparent from this chapter that information about the neolithic of southern Vietnam is scarce and has been largely ignored in past syntheses and comparative studies of mainland Southeast Asia.

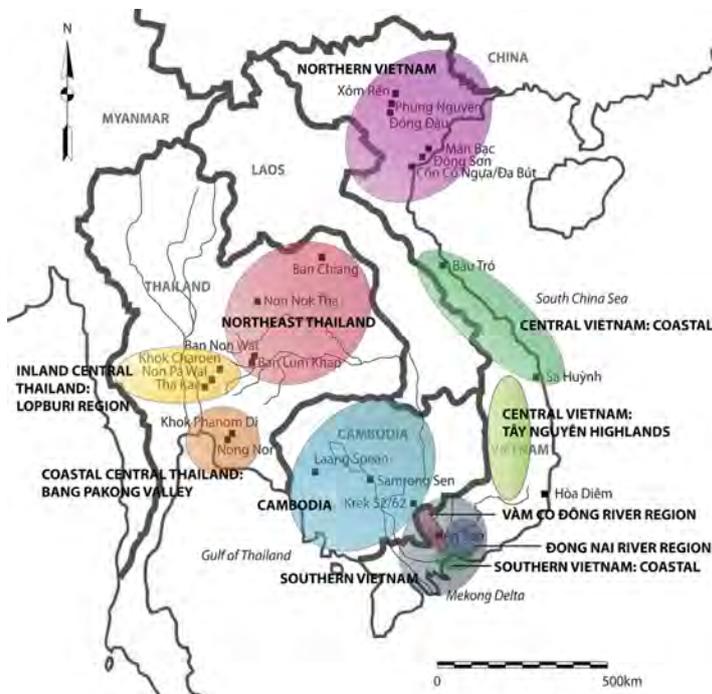


Figure 2.1. Regions of Southeast Asia mentioned in Chapter 2.

Source: Map by C. Sarjeant.

While concerns about the use of the term ‘culture’ in Vietnamese archaeology have already been raised in Chapter 1, this term is retained in this chapter in connection with earlier literature. Detailed accounts of material culture from relevant sites are omitted here, and are presented in detail in the comparisons with An Sơn of Chapters 8 and 9. This chapter is divided into sections based on regions in Southeast Asia, firstly the transition to agriculture and then a background to the neolithic of Southeast Asia. Past research for southern Vietnam is presented, followed by central Vietnam, northern Vietnam, Cambodia, and Thailand. The regions mentioned in this chapter are shown in the map of Figure 2.1.

The palaeolithic and the transition to agriculture

The transition from hunting and gathering to agriculture is not well defined in mainland Southeast Asia and few sites have revealed much insight. Caves and rock shelters received major attention in the 1960s and 1970s in seeking indigenous transitions from hunting and gathering to cultivation (Gorman 1971). More recent research in northeast and central Thailand has resulted in two suggestions: on the one hand, that agricultural people migrated into the area; or, on the other hand, that indigenous hunter-gatherers adopted agriculture and other foreign innovations (Higham and Thosarat 2004b).

The later palaeolithic industries of mainland Southeast Asia have been broadly defined as Sơn Vi (~18000–9000 BC), Hòa Bình (9000–3000/2000 BC) and Bắc Sơn (8000–3000/2000 BC). The stone tools were typically made from river pebbles or cobbles, and the assemblages lacked blade or microlith technologies, while Bắc Bộ lithic assemblages exhibited edge grinding. Some Hoabinhian and Bacsonian cave and rock shelter sites had pottery in their later layers, and Vietnamese archaeologists identify these cultures as ‘Early Neolithic’, but no evidence for cultivation has been recovered from any of them. The pottery from the Bắc Bộ sites of northern Vietnam is recorded as cord- or vine-marked, fired at a low temperature, and tempered with coarse mineral grains (Nguyễn *et al.* 2004; Diệp 1997).

The Đa Bút culture identified in Thanh Hóa Province and the Quỳnh Văn culture in Nghệ An Province, both in northern Vietnam, attest to the existence of local and regional variation during the Early Holocene. The Đa Bút culture includes shell midden sites, dated from 6500 to 4000 BP, that contain coarse pottery with basket impressions. Cồn Cổ Ngựa is one site from the Đa Bút culture, dated to approximately 6000–5000 BP, with burials in a squatting position within the shell midden (Oxenham *et al.* 2005; Diệp 1997; Bùi 1991). Shell middens and cord-impressed or comb-marked pottery characterise Quỳnh Văn sites. Many vessels have pointed rather than rounded bases (Diệp 1997).

The mid-Holocene coastal cultures of northern Vietnam, known as Bàu Tró, Hòa Lộc, Hạ Long and Cái Bèo, exhibit evidence of development from Hoabinhian stone technologies into that described in Vietnam as ‘Neolithic’, due to the presence of putative agricultural items such as axes, adzes and ‘hoes’. No actual evidence for plant and animal exploitation has been discussed for these sites, nor is there much information about the settlement patterns, biology and palaeoenvironments (Nguyễn *et al.* 2004; Phạm 2000, 1997; Higham 1989: 31–45; Patte 1924). This area may offer a regional example of a continuation of fishing, even as inland groups transitioned to agriculture and cultivation.

In the northern highlands of Thailand, Chester Gorman undertook excavations at cave sites in the Mae Hong Son Province in the mid 1960s with the intention of recovering information about hunter-gatherers. Spirit Cave is one of the most renowned sites in this region and its lithic assemblage shares similarities with the Hoabinhian sites of the Bắc Bộ area of northern Vietnam. Stone artefacts, food remains and ashy deposits with associated hearths were recovered.

A concentration of pottery sherds and a rectangular-sectioned stone adze were also identified in association with a hearth that was dated to around 6000 BC. The earliest layers were tentatively dated to 11000 BC (Higham 1989: 45–54; Gorman 1972). Once claimed to have the earliest pottery at 7500 BP, more recent AMS radiocarbon dates from organic resin on the ceramic sherds revised this date to 3000 BP (Lampert *et al.* 2003). A wide variety of fauna and plant remains were recovered, however there was no strong evidence of cultivation (Higham 1989: 45–54; Yen 1977).

Banyan Valley Cave was subsequently excavated in order to identify if the Thai uplands was an area of transition from hunting and gathering to agriculture. The sequence was dated to 3500 BC to AD 900, indicating that there was a long tradition of inhabiting caves and practicing hunting and gathering, perhaps in small, mobile groups (Higham 1989: 54–57). Reynolds' (1992) publication of Gorman's findings at Banyan Valley Cave indicated that the earlier Hoabinhian occupation was replaced by a neolithic presence, with ceramic and rice remains. The ceramics were commonly plain or cord marked, while one sherd was decorated with a 'pinched band' and another was red painted. There was no archaeobotanical evidence of domestic rice cultigens during the Hoabinhian occupation of the cave (Reynolds 1992; *c.f.* Yen 1977).

On the Chao Phraya plains of Thailand, similar evidence to that at Bắc Bộ and northern Thailand was identified. This area included the rock shelter site of Khao Talu, which produced stone beads, polished adzes, potsherds and human bone fragments. The site was originally thought to date as early as the tenth millennium BP, but radiocarbon dates suggest occupation between *c.* 5500 and 1500 BC. Other cave sites, such as Ment Cave contained comparable stone implements (Pookajorn 1990; Higham 1989: 61–65). Laang Spean in Cambodia contained stone artefacts and pottery, including foot ring fragments and decorated sherds with bands and shell impressions. Roland Mourer (1977) concluded that there was no evidence for agriculture at Laang Spean, but research continues at this cave by Heng Sophady and Hubert Forestier (see also Higham 1989: 61–65; Mourer and Mourer 1970). These cave sites are fraught with problems for understanding the stratigraphy and chronology, and the relationship between hunting and gathering cave occupation and neolithic open settlements remains unclear.

There is little reported information about pre-neolithic cultures in southern Vietnam. There has been a general focus on cave and coastal occupation from this phase in Southeast Asia, but southern Vietnam lacks caves. North of Long An Province, it has been suggested that the palaeolithic technologies of Hàng Gòn 6, Dầu Giây 2, Bình Lộc, Núi Đất, Phú Quý, Gia Tân 2 (Dốc Mờ) in Đồng Nai Province, An Lộc in Bình Phước Province, and Vườn Du in Bình Dương Province represent palaeolithic occupations equivalent to the pre-Sơn Vi and Sơn Vi industries of northern Vietnam. These stone assemblages included Acheulian-type bifacial and chopper tools. Discoveries at Suối Quít and Suối Cá (Đồng Nai Province) in 2004 also included stone core tools, choppers and other bifacial tools (Phạm 2005).

More recent summaries of hunter-gatherer archaeology in mainland Southeast Asia have identified three distinct site groups pertaining to this period. The first are the Hoabinhian industries of upland rock shelters, the second are coastal open sites such as Khok Phanom Di and Nong Nor, and the third are cave and open sites inhabited prior to 3000 BC on the inland plains of Guangxi Province in China (Higham 2011). Khok Phanom Di offers evidence of a transitional occupation from hunting and gathering to interactions with neolithic rice farmers and/or related incised and impressed ceramic technologies (Higham *et al.* 2011), which is investigated further in this monograph (see Chapter 9).

While palaeolithic/Hoabinhian technologies were present within the general region, it is possible that the old alluvium of the Mekong Delta region was not favourable for pre-agricultural habitation. Most of the current delta area was still under the high tide zone until 4000 BP,

so deltaic archaeological sites that predate this had drowned by the rising Holocene sea level. It is possible that the whole region was simply too inundated for continuous hunter-gatherer settlement (Proske *et al.* 2010; Tạ *et al.* 2002; Nguyễn *et al.* 2000).

The neolithic of Southeast Asia

The identification of cultigens has been an important component in distinguishing palaeolithic and neolithic, pre-farming and farming, sites in Southeast Asia (e.g. Castillo and Fuller 2010) (see Chapter 1). The rice remains of northern and southern Vietnam have been reviewed and the sequence of rice morphology has been described (Nguyễn 1998). Prior to the recent excavations at An Sơn, Rạch Núi and Mán Bạc, carbonised rice remains were collected from thirteen archaeological sites in northern Vietnam and four in southern Vietnam. Sampled sites in the north were Đồng Đậu, Làng Cả, Xương Giang, Từ Sơn, Gò Chiền Vây, Xuân Kiều, Chợ Ghênh, Hoa Lư, Bài Cũ, Bái Mản, Đồng Tiên, Ba Đình and Làng Vạc, and in the south were An Khê, Thanh Điền, Bình Tả and Ba Thê. After the collection of the ten most represented and widely cultivated rice cultivars in the Đồng Đậu area, it was determined the Đồng Đậu kernels were morphologically similar to the Nếp Cái cultivar, a glutinous round-shaped rice. The grain shape (according to the length/width ratio) distribution showed that the majority of the sample from Đồng Đậu was round, Hoa Lư, Xương Giang and Ba Đình were bold, while modern rice is usually long (Nguyễn 1998).

There have been queries as to whether rice, as the current dominant carbohydrate cultigen in Southeast Asia, was initially cultivated as a wet or dry crop. The two different cropping activities would have had an impact on socio-cultural developments. Wet rice cultivation requires constant attention and settled villages near the fields, while dry upland cultivation is usually associated with swidden fields and some settlement mobility. Prehistoric settlement has been found to have taken place in environments that were moderately suited to wet rice agriculture, typically on low terraces or near streams. It is postulated that, from the initial settlement of Ban Chiang, fixed plots for wetland cultivation were established. This type of cultivation can lead to settlement stability, private land tenure, wealth accumulation and social ranking (White 1995).

More recent research on rice origins from the Yangtze region of China has already been described in Chapter 1 (e.g. Bellwood 2011; Castillo 2011; Lu 2011; Fuller *et al.* 2010; Nakamura 2010; Zhang and Hung 2010; Zhao 2010; Rispoli 2007; Higham 2002). The movement of rice was likely to have spread in lowlands, coastlines or lower mountain slopes (Fuller *et al.* 2010; Fuller *et al.* 2011). Related to this, the cultivation practice was likely to have been dry cropping of *Oryza sativa japonica*, and the Yangtze system of lowland paddy fields was not transferred with *japonica* rice during the neolithic. This rice did not appear in Thailand sites until the first millennium AD, together with *indica* rice in wetland cultivation (Castillo 2011).

The review of the neolithic period of Vietnam by Bùi Vinh (1994) summarises and provides a general model. This review does not refer to the southern provinces: it describes the palaeolithic cultures before addressing the Hoabinhian and Bacsonian cultures, and the Đa Bút, Cái Bèo-Hạ Long and Quỳnh Văn-Bàu Tró cultural developments that followed (Bùi 1994). Northern Vietnam provides an earlier setting for neolithic occupation than other areas of mainland Southeast Asia, with the earliest evidence from c. 7000–5000 BP at Đa Bút (perhaps late Hoabinhian), Cái Bèo and Quỳnh Văn. The neolithic occupation of these areas is associated with a wide variety of pottery vessels and rectangular-sectioned and unshouldered adzes, dated to approximately 4500 to 3000 BP. The environment of what is today the Red River delta was then under marine or

brackish inundation and the only raised land available for occupation was in the inland reaches, with later habitation following the alluviating coastline as it expanded seawards (Nishimura 2005; Bui 1994).

A more recent review of archaeology in northern Vietnam included Hoabinhian sites in a description of the early neolithic (Nguyễn *et al.* 2004). No equivalent review exists for southern Vietnam. It states that the Hoabinhian developed from the Sơn Vi culture, that these people dwelled in caves and most of the stone tools were flaked from pebbles with some examples of edge-grinding. Pottery is only associated with the later occupation of Hoabinhian sites. The Bacsonian culture is described as the later Hoabinhian culture. The middle neolithic includes the Đa Bút, Cái Bèo and Quỳnh Văn cultures, which had evidence of development in ceramics with comb, basket and cord impressions, incision and punctate decoration, and in stone assemblages with untanged and shouldered axes, adzes and chisels. The late neolithic occupation in northern Vietnam includes Hà Giang, Mai Pha and Hạ Long cultures. The material culture of these cultures included ground stone adzes and axes, D- and T-sectioned stone bangles, bark cloth beaters, and some of the ceramics are decorated with cord marking, comb incision, and 'S'-shaped motifs that have been related to the Phùng Nguyên culture ceramics. The comparable late neolithic cultures in central Vietnam are Bàu Tró, Biển Hồ, and Lung Leng. Bàu Tró and Biển Hồ are described further in the Central Vietnam section of this chapter (Nguyễn *et al.* 2004). In southern Vietnam, Nguyễn, Phạm and Tong (2004) identify Cầu Sắt, Cù Lao Rùa and Bình Đa in the Đồng Nai region as late neolithic sites. More recent research in southern Vietnam has outlined a longer neolithic chronology in the region (see the Southern Vietnam section in this chapter and Chapter 8). This also applies to northern Vietnam with research at Mán Bạc (see the Northern Vietnam section in this chapter and Chapter 9).

In terms of tracing neolithic relationships between regions, pottery has always been used by archaeologists to trace origins and cultural contacts. This has been particularly the case for establishing the initial spread of agricultural technologies in Southeast Asia. There is no evidence of a local transition to agriculture in Thailand, and this probably holds true for southern Vietnam as well as Cambodia. In general, the inland Thai sites of Non Pa Wai, Tha Kae, Non Nok Tha and Ban Chiang have similar ceramics, in comparison to the central Thai coastal sites of Khok Phanom Di and Nong Nor Nor, despite their contemporary radiocarbon chronologies. The exchange systems in the northeast would have differed substantially to those in coastal areas, where shell items were valued. With the material goods, ideas and knowledge were also exchanged. Through this kind of interaction it is possible rice cultivation was transferred to the hunter-gatherers of Khok Phanom Di (Higham and Thosarat 1998b: 88) (see the Central coastal Thailand, Bang Pakong Valley section in this chapter).

The links to southern China via ceramics has been identified with incised and impressed decoration further north in the Yunnan Province of China at Baiyangcun and Dadunzi (Rispoli 2007). These cultural connections have also been extended to the Yangtze Valley, since the actual appearance of incised and impressed sherds in Yunnan is rare, and there is increasing archaeological evidence for the diffusion of some cultural features into southern and southeastern China and mainland Southeast Asia from a Yangtze origin (Rispoli 2007). Whether there was a straightforward transference from southern China, and ultimately from an agricultural origin in the Yangtze Valley, or something more complex is still debateable (Zhang and Hung 2010).

Events of neolithic transference no doubt included some interactions between local indigenous hunter-gatherers and immigrant agriculturalists. For example, there is evidence of contact between inland rice farmers and the inhabitants of Khok Phanom Di in terms of material culture, rice cultivation and isotopes of individuals (Higham *et al.* 2011; Bentley *et al.* 2007; Higham

and Thosarat 1998b: 88–89). The flexed burials at Ban Non Wat, northeast Thailand have been hypothesised to be hunter-gatherer individuals, which date to the same time as the early extended neolithic burials (Higham and Wiriyaromp 2011; Higham *et al.* 2011). Morphometric data of human remains indicated that Mán Bạc was occupied by both neolithic immigrants and indigenous groups (Matsumura *et al.* 2008). These examples illustrate that interactions between hunter-gatherers and farmers are likely to have varied regionally.

Southern Vietnam

Issues exist surrounding the establishment of a chronology and relating sites to one another in southern Vietnam. Nishimura and others (Nishimura 2002; Nishimura and Vương 1997) have recounted the problems of using insecure radiocarbon dates from many of these sites and the lack of stratigraphical understanding in the region. By focusing on ceramic form and decoration, Nishimura Masanari (2002: 50–51) has formulated four periods for the neolithic occupation of southern Vietnam (Table 2.1):

- **Neolithic period I**

No prehistoric sites in southern Vietnam predate this period, which is represented by the An Sơn 1997 excavation layer 3–5 and the lowest layers of Đa Kai. The material culture included cord-marked vessels, red-painted vessels, and some vessels with incised wave motifs. There was minimal variety in pottery forms during this period. Nishimura (2002) suggests this period began around 2000 BC.

- **Neolithic period II**

There was an increase in the variety of forms in this period and the first fibre-tempered ceramics appeared. Gentle wave motifs were more prevalent on the shoulders of ceramic vessels than in the earlier period. The shouldered and unshouldered adze types were triangular and trapezoidal shaped with rectangular and trapezoidal cross-sections (Nishimura 2002: 46, figure 13, 51). Based upon radiocarbon dates from An Sơn and Lộc Giang, Nishimura (2002) estimates this period dates to 2000–1500 BC.

- **Neolithic period III**

Zigzag decoration on the shoulders of pottery vessels was prominent in this period and a comb tool was applied to create multi-linear impressions in a ‘rocker’ type of decoration. The shouldered and unshouldered adzes had more rectangular cross-sectioned adzes than the earlier periods. This period dates to the latter half of the second millennium BC, based on radiocarbon dates from layer 2 of the 1997 excavation at An Sơn (Nishimura 2002).

- **Neolithic period IV**

Flared and extended rim forms appeared at this time. The varieties of ‘rocker’ decorations within geometric divisions expanded. Unshouldered adzes appeared in greater numbers than shouldered forms. Lithophone specimens were at An Sơn and Đa Kai. The boundary between this period and the succeeding bronze age phases is difficult to ascertain since so few southern Vietnamese sites contain deposits that extend from the neolithic into the bronze age, but this period is estimated to date to around 1000 BC (Nishimura 2002).

Temporal distinctions have been reported for some ceramic features, although these are not always clear. Development of the neolithic sequence will only be resolved with further excavation and an increased understanding of the relationships between the sites.

Table 2.1. Neolithic periods at sites in southern Vietnam.

	Period I	Period II	Period III	Period IV	Later Prehistoric
An Sơn	*	*	*	*	-
Lộc Giang		*	*	*	-
Rạch Rừng			*	?	*
Rạch Núi	-	-	*	*	-
Giống Cây Trôm	-	-	-	*	?
Đình Ông		*	*	*	-
NDII		*	*	?	-
Bến Đò	?	*	*	*	-
Long Bửu		?	*	*	*
Bình Đa	-	*	*	*	-
Cái Vạn	-	*	*	*	*
Gò Cá Sỏi	-	-	*	*	-
Suối Chồn		*	*	*	*
Cầu Sắt	?	*	*	*	-
Suối Linh	?	*	*	*	-
Đốc Chùa		*	*	*	*
Đa Kai	*	*	*	*	-

Source: Nishimura 2002: 50, table 2.

Key: * present, – absent, ? possible

Vàm Cỏ Đông River region

There has been some past research in order to establish a chronological sequence for the Vàm Cỏ Đông River region. Inaccurate radiocarbon dates have exacerbated the chronological confusion, but it has been suggested that a clear ceramic sequence will ease the confusion (Nishimura and Vương 1997: 78). (Refer to Figure 1.3 and Figure 2.1 for the location of this region and the mentioned sites).

The past research at An Sơn is discussed in Chapter 4. Two sites located near An Sơn are considered in site comparisons, these being the nearby site of Lộc Giang and Đình Ông in the upper Vàm Cỏ Đông River. Little information about the excavations at these sites is available. Lộc Giang has a deep neolithic sequence that dates to the second millennium BC (Nishimura and Nguyễn 2002; Quang and Ngô 1994), and it shares material culture with An Sơn, as does Đình Ông. The sites of the Vàm Cỏ Đông River region are discussed further in the ceramics comparison with An Sơn in Chapter 8 (Đình Ông, Gò Cao Su, Lộc Giang, and Rạch Rừng, which is located along the Vàm Cỏ Tây River).

Đồng Nai River region

The sites within the area of the Đồng Nai River have been studied on a small scale by Vietnamese archaeologists (sometimes with Japanese colleagues) or by French colonial-era researchers. More synthesis of this region exists in English than for the Vàm Cỏ Đông River region. (Refer to Figure 1.3 and Figure 2.1 for the location of this region and the mentioned sites).

During the early years of research, from the 1880s, many artefacts were collected but little was known about their context. Excavations did not commence in the Đồng Nai region until the 1960s and 1970s. Researchers like Saurin and Fontaine tended to collect a large number of

artefacts with very little reporting, covering only their initial observations and minor attempts at analysis (Lê 1986: 58). Cầu Sắt is thought to be one of the earliest sites, dating to about 4500–4000 BP (Lê 1986: 61). Although, there are no radiocarbon dates for Cầu Sắt, the stone adzes are similar to those in the earlier neolithic layers of An Sơn (Hoàng and Nguyễn 1977; Hoàng *et al.* 1976).

The ‘Đồng Nai cultural complex’, as named by Vietnamese archaeologists, has been differentiated from other cultures for its neolithic period characteristics. The Đồng Nai culture has been described as consisting of four periods: neolithic (Cầu Sắt-Suối Linh, 4500–4000 BP); early bronze (Núi Gốm-Bình Đa-Cù Lao Rùa, second millennium BC); late bronze (Độc Chư-Bưng Bạc, first half of first millennium BC); and early iron (Suối Chồn-Phu Hoa, second half of first millennium BC). These periods were not dated with absolute methods (Phạm 1996: 80–86).

The lithic assemblages are most frequently discussed for neolithic Đồng Nai sites. Cầu Sắt contained shouldered adzes and stone armrings with rectangular or trapezoidal cross-sections. The pottery included pedestalled bowls and tall jars with flat bases (Higham 1989: 169; Hoàng and Nguyễn 1977; Hoàng *et al.* 1976). The excavations at Bến Đò, located in the vicinity of Ho Chi Minh City, revealed a large variety of ceramic and stone artefacts, including of clay pellets and stone bangles. Large shouldered adzes were more common than rectangular cross-sectioned and unshouldered varieties (Higham 1989: 169–171; Phạm 1977; Fontaine 1975; Fontaine and Delibrias 1974; Fontaine 1972, 1971).

As at An Sơn, shouldered adzes dominated the assemblages of Bến Đò, Phước Tân and Bình Đa, while unshouldered tools were more frequent at Độc Chư, Suối Chồn and Rạch Núi (all sites along or near the Đồng Nai River). The Đồng Nai sites also contained triangular stone adzes, particularly in the earlier period, and shouldered and non-shouldered stone tools with characteristics observed on younger bronze axes (Phạm 1996: 80–86; Phạm and Nguyễn 1993).

Cù Lao Rùa, also located near the Đồng Nai River, was first documented in 1888 by Émile Cartailhac (1890) and excavations were conducted in the early twentieth century. More recent excavations have shown that the site included shouldered and rectangular-sectioned adzes, pottery, stone bracelets, pendants and polishers. Bronze may have also been associated with the later occupation of Cù Lao Rùa (Nguyễn 2008; Higham 1989: 169).

Some of the more recent and reliable research has been undertaken at Đa Kai, located in the upper reaches of the Đồng Nai River. It is a circular and raised site with a central depressed area, similar to those of the Memot area in Cambodia. The site has been dated to approximately 3450 to 3200 cal. BP. There is no evidence of metal, and the site represents a neolithic chronology. Pits and burials were identified, inclusive of a separate mound where the burials were placed. The stone implements included lithophones as surface finds, adzes, debitage, blanks for tool production, hammerstones, cores, polishing and grinding stones, and preforms. The latter were similar to preforms at the workshop site of Suối Linh, Đồng Nai Province. The stone axes and adzes were manufactured from schist and tuff-dacite in both shouldered and unshouldered varieties. The pottery assemblage of Đa Kai is described as sharing similarities with Bình Đa and An Sơn. The fabrics were separated into two categories: one with sand and lime in large and angular particles, and the other with sand and lime in fine particles (Nishimura *et al.* 2009).

It is emphasised in the Đa Kai report that ‘In the southeastern part of Vietnam, the prehistoric pottery chronology has not been established in detail, except for several sites in Long An Province’ (Nishimura *et al.* 2009: 35) (e.g. Nishimura and Nguyễn 2002; Nishimura 2002). The published data from the Đồng Nai area are very limited, and usually the only person able to understand the assemblage from each site is the individual who conducted the original analysis. This situation gives little scope for further comparative study (Nishimura *et al.* 2009). Much of the research conducted

in Đồng Nai Province has had little regard for stratigraphy and relationships between sites (Higham 1989: 172; e.g. Trịnh *et al.* 2003; Phạm and Nguyễn 1993; Hoàng and Nguyễn 1977; Hoàng *et al.* 1976; Fontaine 1972, 1971). The ceramics and material culture of sites in the vicinity of the Đồng Nai River and Ho Chi Minh City (Bến Đò, Bình Đa, Cái Vạn, Cầu Sắt, Cù Lao Rùa, Đa Kai, Rạch Lá, and Suối Linh) are described further in the comparative study in Chapter 8.

Coastal southern Vietnam

There are sites located near to where the Vàm Cỏ Đông and Đồng Nai Rivers filter into the Mekong Delta. The coastal proximity of these sites presumes that these sites may have been under sea level 4000 years ago (see Chapter 1), but the presence of Rạch Núi with neolithic material culture suggests that areas were above sea level for short and long periods. At this stage, the chronology and sea level around the area of Rạch Núi is not known and requires further research.

Rạch Núi (Figure 1.3, Figure 2.1) had a similar period of occupation to Cù Lao Rùa with rectangular-sectioned and shouldered adzes, pottery and possibly some bronze (Higham 1989: 169). The stone tool assemblage presented less variety at Rạch Núi with stone shouldered adzes partly replaced by tortoise-bone shouldered adzes (Bùi *et al.* 1997). It has been suggested that the sea tortoise/turtle-shell tools had been used for handicrafts, such as cutting clay or mixing materials for pottery production (Phạm 1996). More recent research conducted in 2012 at Rạch Núi is discussed in detail in Chapter 8.

Post-neolithic occupation in southern Vietnam

Many of the sites located in the Đồng Nai region had evidence of metallurgy and post-date An Sơn. Sites like Đốc Chưà have casting moulds and bronze and iron age occupation, dated to 2495±50 and 3145±150 BP (uncalibrated). The later occupation of Cù Lao Rùa also had casting mould evidence, suggesting continuity from neolithic to metal age sequences. This period has been associated with technological developments in stone tool, metallurgical and ceramic manufacture, craft specialisation and increasing social complexity (Nguyễn 2005).

The emergence of ranked societies is particularly noticeable in the Đồng Nai archaeological sites, especially in the Xuân Lộc region where cist tombs containing bronze halberds were found at Hàng Gòn, dating to the first century BC (Eiji 2005). Hàng Gòn has evidence of copper metallurgy, however the site was not systematically excavated and Edmond Saurin (1963) collected material in a bulldozer excavation. Three sandstone moulds, two for casting axes and one for three ring-headed pins, were identified. Saurin (1963) suggested there were similarities between the axes of Hàng Gòn and those from the Red River Valley, Luang Prabang in northern Laos, and the Mlu Prei region of north central Cambodia. No glass or iron was recovered from the site (Higham 1989: 169). Clay balls and stone rings and beads were recovered from these metal-bearing Đồng Nai sites (Nguyễn 1980).

At Đốc Chưà, ceramic and sandstone mould fragments were recovered. The implements made on site included tanged arrowheads, axes, bells, socketed spearheads, harpoons and chisels. There are parallels in the metal implements and some of the stone artefacts, including bracelets and adzes, between Đốc Chưà and assemblages in northeast Thailand (Nguyễn 2005; Higham 1989: 171–172).

The mound settlement of Gò Ô Chưà, located on the Vàm Cỏ Tây River to the south of the Vàm Cỏ Đông River, has evidence of metal age occupation and is dated to 900–400 BC. Andreas Reinecke connects the ceramic pedestals, some with three ‘horn-shaped’ points, to salt production and industrial-scale activity. A burial site dated to 400–100 BC overlays this evidence. It incorporated adult interments and infant jar burials that were associated with briquetage and pedestal remains from the earlier occupation, together with iron, bronze, and ivory, bone and

shell offerings (Reinecke 2010). Many of the ceramic vessels were high pedestalled dishes and everted rimmed globular vessels with incised decoration, that were tempered with fibre and fired in a reducing atmosphere to create a black surface, not unlike some pottery of Cambodia and northeast Thailand during the iron age, e.g. Phimai Black wares (personal observation).

Giồng Cá Vồ, southeast of Ho Chi Minh City on the coast of southern Vietnam, was excavated in association with the nearby site of Giồng Phet, where seafaring interactions are believed to have taken place about 2000 years ago (Hung *et al.* 2007). These sites have jar burials and evidence of occupation and a range of ornamental items made from nephrite, carnelian, agate, gold, glass, bronze and shell (Nguyễn 2001), as seen in northeast Thailand during the iron age (e.g. at Noen U-Loke, see Higham *et al.* 2007; Talbot 2007; Sarjeant 2006). Some researchers suggest that Giồng Cá Vồ was related culturally to the south-central coastal Vietnam sites, such as Hòa Diêm. Giồng Cá Vồ may be part of a southern Sa Huỳnh tradition that use spherical ceramic jars to contain human remains (Lâm 2011).

The continuity from neolithic to metal age sites has not been so well-documented in southern Vietnam, whereas there is some understanding regarding the development from neolithic sites like Mán Bạc to Phùng Nguyên and the later bronze age Đông Sơn sites in northern Vietnam (Matsumura *et al.* 2008; Nguyễn 1980). The nature of the relationship between the discussed neolithic sites, subsequent metal age developments and Sa Huỳnh in the southern coastal region (e.g. Hòa Diêm), and Óc Eo developments further south, remain unclear (Bùi *et al.* 1997).

This review of the sites of southern Vietnam has been kept brief since more comprehensive site overviews are provided in the comparative analysis with An Sơn in Chapter 8.

Central Vietnam

The sites of the central highlands in Vietnam have been likened to the eastern Nam Bộ sites, such as Cầu Sắt, Bến Đò, Đốc Chứa, Cái Vạn and Cài Lang (around Ho Chi Minh City and in Đồng Nai Province) (see Central Vietnam section in this chapter). Commonalities between the neolithic Tây Nguyên sites of the central highlands and the Bàu Tró sites of Quảng Bình Province further north have also been noted (refer to Figure 2.1 for the location of this region). The research in this region has provided some broad observations about the neolithic to metal age transition. The neolithic is characterised by small rectangular-sectioned adzes/axes (some of which are slightly shouldered) and coarse cord-marked pottery, while appliqué and dot designs are rare. Notable material culture absences are large 'hoes' and bronze casting moulds. Small mouth-to-mouth jar burials (found at Suối Chình, Quảng Ngãi Province), but no large jar burials, were recovered. The neolithic part of the sequence is thought to date to between *c.* 4000 and 3500 BP (Trần 2005).

The later sequence is represented by evidence for metallurgy, including bronze casting moulds, in addition to large shouldered adzes and large jar burials, dating to *c.* 3500–3000 BP (Trần 2005). Trần Quý Thịnh (2005: 143) also suggests that the Tây Nguyên sites influenced Sa Huỳnh developments and the iron age of Trung Bộ (i.e. the south-central coast), such as Hòa Diêm, based on the synthesis of sixty sites identified in the Tây Nguyên region.

Surface material collected from Hòa Vinh, located just north of Phan Thiết on the coast of south-central Vietnam, included large ceramic vessels made with mineral sands, with paddle linear impression and cord-marking on the surfaces, appliqué, incisions over the top of paddle impression, zigzag and wave incisions, and possibly some punctate stamping. Everted rim forms with paddle impressed line markings on the exterior surface of the rim were recovered. Hòa Vinh also had slate rings, shell items and a spindle whorl. Hòa Vinh has been estimated to be an early or proto-Sa Huỳnh site (Fontaine and Davidson 1980).

Vietnamese archaeologists consider the Biền Hồ and Bàu Tró cultures of coastal north-central Vietnam as ancestral to the Sa Huỳnh culture, and there are parallels in northeast Cambodia and southern Laos (Hoàng 1994). The Biền Hồ ceramics appear to be quite distinct from the traditions further south. The archaeological sites associated with the Biền Hồ culture are located on the slopes or foots of hills surrounding lakes or streams and are distributed in clusters in the central highlands. Only a few sites have been identified, including Biền Hồ and Trà Dôm, and this may be due to a lack of viable water sources in the region. The majority of the material culture consisted of axes, adzes and polishing stones, while a few stone ornaments have been recovered, such as the stone bangles at the Biền Hồ site. Most of the stone artefacts were made of basalt at Biền Hồ and of phtanite at Trà Dôm. Silicate-based/silex lithics were quite rare. The stone tools were polished and resharpening was evident. There were a large number of shouldered adzes/axes and few rectangular-sectioned adzes/axes, making this culture quite distinct from those of the southern provinces. Most of the adzes were oval or half-oval in cross-section and these ‘buffalo-tooth axes’ are a characteristic feature of the Biền Hồ culture (Hoàng 1994).

Complete pottery vessels have not been recovered at the Biền Hồ sites. The pottery is typically coarse and tempered with quartz, either red or grey in appearance, as well as some black pottery in smaller quantities. Hoàng Xuân Chinh (1994) states that the pottery was wheel-made. Eighty percent of the pottery was undecorated at Biền Hồ and Trà Dôm, however the decoration that was present included fine cord-marking, comb/punctate impressions (‘line-dots’), appliqué, and stamped small rings. The rim forms were commonly everted or direct. Bone and copper tools have not been recovered at the Biền Hồ culture sites. Nor have any animal or human bone or teeth been recovered, perhaps due to the acidic soil conditions (Hoàng 1994). The neolithic ceramics at Bàu Tró and related sites are discussed further in Chapter 9.

Northern Vietnam

In northern Vietnam there has been a focus to link indigenous groups of Vietnam to the later bronze age Đông Sơn sites. The research focusing on the transition from palaeolithic to neolithic has already been discussed for northern Vietnam (Refer to Figure 2.1 for the location of this region). This section addresses the site of Mán Bạc, which has evidence of neolithic habitation. Mán Bạc is located in Ninh Bình Province, about 25 km from the coast. Research at this site has not only focused on the link between indigenous groups (Hoabinhian, Bắc Sơn and Đa Bút) but also on intrusive agricultural groups from the north. The Mán Bạc site has a wide repertoire of stone tools, semi-precious stone ornaments and jewellery, ceramic net sinkers, high-footed ceramic bowls, clay support stands, and mushroom-shaped ceramic anvils (Matsumura and Oxenham 2011; Oxenham *et al.* 2011; Nguyễn 2006).

Mán Bạc has a neolithic occupation, dated from 3800 to 3500 years ago (Oxenham and Matsumura 2011; Oxenham *et al.* 2008; Nguyễn *et al.* 2004). Some of the pottery at this site also exhibited parallels with the early bronze age Phùng Nguyên culture, as well as unique local developments (Matsumura *et al.* 2008; Trịnh and Hà 2004). More recent interpretations of the site outlined Mán Bạc as part of the early neolithic demographic expansion from southern China to northern Vietnam with the bioarchaeological evidence for high fertility and population growth in response to the immigration of food producers to the region (Oxenham and Matsumura 2011; Bellwood and Oxenham 2008). The morphometric data of the human remains indicate that the site did not include a population of neolithic immigrants alone, but also individuals with affinities to indigenous groups in the region (Matsumura *et al.* 2008). Some of the ceramic decorations, namely geometric impression, recall that of late neolithic southeastern China and Hong Kong (Jiao 2007: 62–66; Ng *et al.* 2005; Meacham 1978). The ceramics of Mán Bạc are discussed in greater detail in Chapter 9.

The Phùng Nguyên culture sites of the Red River delta region have exhibited material culture evidence that is shared across many sites, including Phùng Nguyên itself and Xóm Rền. The sites have a wide repertoire of stone tools, inclusive of polished rectangular-sectioned adzes and arrowheads. Stone arrowheads were rare in Vietnam during the neolithic, and the Phùng Nguyên examples have been suggested to be precursors to the bronze arrowheads at the later Đông Sơn sites. Stone bracelets and beads, ceramic spindle whorls and clay pellets have also been recovered from Phùng Nguyên sites. The ceramics of the Phùng Nguyên sites are well-known for their incised decorations in ‘S’ and wave shapes, and there are parallels between these motifs and those on Đông Sơn drums and ‘Sa Huỳnh-Kalanay’ ceramics (Hán 2009; Nguyễn 1980). Xóm Rền is discussed further in Chapter 9.

Cambodia

Laang Spean in Battambang Province (Figure 2.1) has some of the earliest known ceramics in Cambodia, inclusive of pre-neolithic late Hoabinhian pottery. The stratigraphy at Laang Spean has been difficult to understand in terms of the relationship between the Hoabinhian and neolithic occupations. Recent research indicates intermittent use of the cave since these periods into recent history, with mixed occupational layers (Forestier and Heng 2010). The second layer of occupation at Laang Spean is thought to be neolithic and to date to the mid-third millennium BC. The earlier ceramics from Laang Spean were either cord-marked or plain, while the later ceramics were incised and impressed (Stark 2003).

The Laang Spean excavations primarily revealed lithic and pottery evidence. Mourer (1977; see also Mourer and Mourer 1970) describes most of the stone tools as scrapers, flakes or sumatralith-types. No polished or ground stone tools were found. The ceramic assemblage included coarse sand-tempered fabrics and some organic tempers (Mourer 1977). The vessel forms included globular shapes with everted rims, and ring-footed cups. Decoration covered entire surfaces with combinations of linear and curvilinear incision, punctate impression, and nail impression (Mourer 1977). The sequence of the ceramic assemblage remains unclear and the ceramics of Laang Spean are described further in Chapter 9.

Samrong Sen in Kampong Chhnang Province (Figure 2.1) is a well-known site amongst Southeast Asian prehistorians. Much of the research at Samrong Sen took place in the nineteenth and early twentieth centuries. The material culture from Samrong Sen has been repeatedly transported since then, and loss and misplacement has been an issue. Some of the archaeological fieldwork was published by Henri Mansuy (1923; see also Mansuy 1902). Samrong Sen contained evidence of neolithic and bronze age occupation, with most discussion focusing on the links between the bronze age sequence at Samrong Sen and at sites in Thailand and Vietnam (Heng 2007; Stark 2003; Vanna 2002).

Heng Sophady (2007) has drawn comparisons between Samrong Sen and the circular earthwork sites of eastern Cambodia (discussed further below, in this section), since both have revealed large quantities of stone artefacts. The earthwork sites contained stone flakes and debris and were associated with unfinished tools, fragments, preforms and polishers. Activities related to flaking, grinding and polishing were evident. Samrong Sen exhibited only small amounts of such stone items. Morphologically, the adzes, axes, chisels and shouldered adzes were different in form and size between the circular earthwork sites and Samrong Sen. The Samrong Sen stone tools were generally larger than those at the earthwork sites (Heng 2007: 81–84).

The shouldered adze technology can be traced to part of a tradition that moved through Laos, Thailand, Cambodia and southern Vietnam. The rectangular-sectioned adze technology was widespread throughout Southeast Asia and into the Pacific. It has been suggested by Duff (1970:

126) that this form was transferred from southern coastal China to mainland Southeast Asia by coastal routes and boat movements that also included the Philippines, Taiwan and northeast Indonesia. Inland contacts may also have been important for inland areas of Cambodia, Laos, Thailand and Vietnam, with technologies deriving from southwest China and Yunnan. However, cultural distinctions as argued on the basis of typological variations in lithic tools can be ambiguous (Heng 2007: 84–91; Duff 1970: 126). The ceramics from Samrong Sen are discussed in greater detail in Chapter 9.

Following the earlier Samrong Sen and Laang Spean occupation, the ‘Mimotian’ circular earthwork sites of eastern Cambodia and southwestern Vietnam have been described as ‘Neolithic’. These sites occur quite close together and cover a known area of km² (Dega 2002: 1). There is contention about the exact chronology of these sites due to the presence of some glass at Krek 52/62 (Haidle 2002). Bernard Philippe Groslier (1966b: 195, 267) suggested the ‘Mimotian culture’ sites were neolithic after excavations at a circular settlement of Kampong Cham dated to approximately 2500 to 2000 BC. Some of the first radiocarbon dates for the Mimotian sites came from J.P. Carbonnel in 1970, who regarded the mounds as accumulations of discarded waste. A radiocarbon sample of charcoal from within a potsherd was dated to 2130–1150 BP, much later than Groslier had suggested. Carbonnel also believed the sites were occupied continuously until the tenth century AD, into the period of the Angkorian kingdom (Dega 1999).

Groslier (1966a, 1966b) labelled these sites as neolithic ‘forts’, and Saurin (1969) described the earthwork settlements as late Cambodian neolithic. Carbonnel (1979) continued to investigate several of Malleret’s identified sites at Memot and Krek and expanded his work to the west of the circular earthwork sites in Cambodia, noting the neolithic layers. A reappraisal of absolute dates for earthwork sites in Cambodia by Albrecht *et al.* (1999; see also Haidle 2000) deduced that they dated from the first millennium BC. Other researchers have suggested the occupation of the earthworks from 3400 BC to historic times (Mourer 1994), while the absolute dates range from 2300 to 300/200 BC (Latinis and Dega 2011). There is some contemporaneity between the sites, but the youngest and oldest do not have overlapping chronologies.

Dega (1999) has reported similarities between the sites excavated by Albrecht, Albrecht and Haidle at Krek (Malleret’s site #15) and that by Dega and Chuch Phourn 7 km to the east at Chi Peang. These similarities extend to landscape settings, architectural components, artefact assemblages and stratigraphic profiles. The youngest site of the Cambodian earthwork settlements was Chi Peang, which was occupied for 790–430 years. All of the sites thought to predate Chi Peang presented a shorter occupation sequence than Chi Peang itself. Greater artefact diversity was also observed at Chi Peang (Dega 2002: 60). The earlier sites are located in the east and the later sites in the west in the Memot District. Chi Peang has a later chronology than Phum Trameng, 35 km to the east. Phum Trameng was abandoned prior to any occupation at Chi Peang. Based on the available radiocarbon dates, it has been argued that the circular earthwork sites were initially constructed further east and later in the west. This hypothesis requires testing with further dates. The reasons for such patterning may be the result of land-use strategies, i.e. slash and burn agriculture, or because of inter- or intra-group competition (Dega 2002: 60).

Dega (1999) has commented on the differences between these earthworks and those in northeast Thailand that are described as ‘moated’, and were constructed in the iron age (McGrath and Boyd 2001). The Memot sites differ in terms of size and the presence of encircling walls and depressions. They were not used as waterways, but perhaps had several functions, including some defensive ones. They are doughnut-shaped with encircling earthen walls with a parallel depression and raised earth platform inside the wall (Dega 2002: 1; 1999). Regardless of their function, whether for water storage, irrigation, cultivation or defence (see McGrath and Boyd 2001;

Higham 1996b; Moore 1988), these Northeast Thailand moated sites have been AMS dated to the later iron age sequences, *c.* AD 200, thereby postdating the earliest Memot sites (Higham and Higham 2009b; McGrath and Boyd 2001).

In northeast Thailand, occupation is known to have pre-dated the formation of some earthworks (Dega 2002: 14–15). This may have been the case for the earthwork sites in Cambodia and Vietnam, which have also been associated with a number of functions and interpretations. Louis Malleret (1959) stated the earthwork sites were fortified settlements that once had palisades on the tops of the outer banks. The analysis of the presence and absence of material culture from Malleret's number 15 site at Krek was conducted by the Royal University of Fine Arts. It was interpreted that the site was occupied twice with periods of abandonment, the first for 500 years and the second for 1000 years (Dega 2002: 17–18; Kojo and Pheng 1998, 1997; Nop *et al.* 1996).

Recent research on the ceramics of earthwork sites in the Kampong Cham area with EDXRF (energy dispersive x-ray fluorescence) analysis has shown that local materials were used in ceramic manufacture. There is no evidence for centralised pottery production, but some trading and interaction are apparent. There is no indication that circular earthwork ceramics were transported to the floodplain sites around the lower Mekong Delta, or vice versa, during the metal age and pre-Angkor/Angkor period (Latinis and Dega 2011). The neolithic ceramics from the Memot sites, particularly Krek, are discussed further in Chapter 9.

Thailand

Central coastal Thailand, Bang Pakong Valley

Settlements with a mixed economy of hunting, gathering, animal husbandry and rice cultivation were probably expanding within Southeast Asia from the third millennium BC. Population growth and sedentary settlements occurred at sites like Khok Phanom Di, a sedentary coastal community in the Bang Pakong Valley of central Thailand (Refer to Figure 2.1 for the location of this region and sites mentioned in this section). Khok Phanom Di has been dated from around 2000 to 1500 BC and the occupants at the site were skilled at pottery manufacture (Higham and Bannanurag 1990: 19; Higham 1989: 80–81).

Coastal zones were attractive areas for habitation and it was once thought communities moved into more marginal zones, further from the coast, following over-population, resource stress and increased social ranking in optimal areas for habitation (Higham 1989: 86–87). One theory posited by Higham and Thosarat (1998b: 69) was that rice cultivation originated in the less suitable coastal environments and then spread north via river systems. Thompson (1996) stated that it is uncertain whether the earliest domesticated rice at Khok Phanom Di was cultivated locally or imported. More recently it has been suggested that the hunter-gatherers of Khok Phanom Di were in contact with inland agricultural groups as evidenced in part of the sequence, and that the Khok Phanom Di inhabitants eventually adopted rice cultivation (Higham *et al.* 2011; Bentley *et al.* 2007; Higham and Thosarat 2004b).

Areas where there were predictable marine resources, such as at Khok Phanom Di, would have been the most preferable environments for settlement by hunter-gatherers who exploited such foods. Neighbouring inland areas were occupied when population increase and resources stresses ensued. While marshlands may be well-suited to rice growing, domestic cattle and pigs were not so well-suited to marshy coastal areas and most likely thrived at sites further inland. In the richest marine settlement of Khok Phanom Di, wealth is indicated and social ranking was illustrated through mortuary rituals and feasting, with pottery, turtle carapaces and shell ornaments appearing as grave goods (Higham *et al.* 1992; Higham 1989: 87, 185).

A site survey at Nong Nor, 14 km south of Khok Phanom Di and located close to brackish water and terrace soils, was conducted in 1984, and excavations commenced the following year. The aims of the excavation were to advance to understanding of coastal adaptations. The lowest layer at the site was a shell midden, dated to 2459±58 BC, with ceramic sherd sheets over burials, and burnt red soil, clay anvil fragments and burnishing stones for ceramic manufacture. The midden was disturbed by later inhumations. The occupation phase pottery included in the midden was decorated with parallel incised lines and curvilinear patterns, and had rim forms paralleling those at Khok Phanom Di. Other Nong Nor material culture included bone fish hooks and small conical clay objects with an unknown function. No rice remains were recovered from this phase, not even as temper in the pottery. This early occupation at Nong Nor has been associated with broad spectrum fishers and foragers (Higham *et al.* 1997: 175–189). It has been hypothesised that Nong Nor was a seasonal site, where the inhabitants exploited marine resources in the dry season and then returned to inland agricultural areas in the wet season (Higham and Thosarat 1998a: 529–530).

Khok Phanom Di and Nong Nor illustrate the complications in understanding the transition from hunting and gathering to cultivation. These coastal regions indicate a complex relationship between adopting agriculture and continued exploitation of local marine resources. Even when groups were exposed to intrusive neolithic groups, there may have been a resistance to adopting new subsistence strategies while neolithic material culture was perhaps more readily adopted. The shared material culture at Khok Phanom Di and Nong Nor indicates contact during the earlier phases of occupation at these sites, although it seems that rice cultivation was only adopted at Khok Phanom Di once the inhabitants came into contact with inland rice farmers, as indicated later in the sequence. The shared expression at Nong Nor and Khok Phanom Di and divergence of subsistence strategies and other local developments after settlement indicates cultural variation, even between nearby sites, after the initial occupation of potentially related groups (Higham *et al.* 2011; Higham and Thosarat 1998a: 529–530). Khok Phanom Di and Nong Nor are discussed further in Chapter 9.

Inland central Thailand, Lopburi region

Archaeological research in the Lopburi region of central Thailand has revealed sites with neolithic to metal age sequences (refer to Figure 2.1 for the location of this region and sites mentioned in this section). Tha Kae and Khok Charoen are two sites in this region with ceramic assemblages that have parallels with other neolithic sites in Southeast Asia. The excavations at Tha Kae in central Thailand revealed five layers, dating from approximately the second millennium BC until the Dvaravati, Angkor and Ayutthaya periods of more recent histories. The basal layer, layer 5, had very little cultural material, while layer 4 consisted of material that was likely to be contemporaneous with neolithic occupation in Southeast Asia at 4000–3000 BP. The decorations on the ceramics from this layer include a zigzag incised pattern, which was uncommon on red, quartz sand-tempered wares in central Thailand, and is comparable to ceramics in the northeast Khorat Plateau sites, such as early period Ban Chiang. The thick red-slipped and burnished wares (TRBW) are characteristic of the early ceramic assemblage at Tha Kae (Ciarla 1992; Rispoli 1992).

The TRBW have simple direct rims with rounded or lightly tapered lips and cord impressions. The fabrics are coarse with ‘vegetal’ particles. Black wares with ‘scale pattern’ impressions (SPI) commonly in ‘S’- or square-shaped meanders, and were created with incised lines and filled in with a scale pattern (Rispoli 1992: 131). Rispoli (2007, 1992) has observed the wide distribution of this pattern on pottery in Southeast Asia. Correlations with Tha Kae were noted in central Thailand, at Khok Charoen, Sab Takien, Sab Champa II, Non Pha Wai, on the Khorat Plateau, early period Non Nok Tha, and early period Ban Chiang. Similarities have also been observed at Samrong Sen

in Cambodia and the Hòa Lộc and Phùng Nguyên sites in Vietnam. The early Tha Kae material was thought to date to between 3000 and 2000 BC, but there are no published radiocarbon dates for this occupation (Rispoli 1992). Tha Kae is discussed in greater detail in Chapter 9.

Khok Charoen is located in the Pasak River Valley and was excavated from 1966–1970 (Ho 1984; Watson 1979). There is evidence for rice cultivation, although no metal was found in the burials. The mortuary ceramics were decorated with burnishing, red slipping and cord-marking, as well as more ornate incised and stamped or impressed designs. The shell jewellery included disc beads, but not in the same quantity as at Khok Phanom Di (Higham and Thosarat 1998b: 81–82). Khok Charoen is described further in Chapter 9.

Northeast Thailand

Farming communities appeared on the Khorat Plateau, northeast Thailand, from *c.* 2300 BC. The earliest inhabitants consumed rice and used rice chaff to temper the pottery. Domestic pig and dog remains have also been recovered from these sites. The people of this earlier settlement phase also hunted and collected freshwater shellfish and caught fish from local streams and lakes (Higham and Thosarat 1998b: 82–85). Over the last decade, moated site of northeast Thailand, Ban Non Wat, has produced unparalleled archaeological discoveries, with cemetery and occupational evidence that extends from the neolithic to the bronze and iron ages. Ban Non Wat offers comparative material for the contemporary developments in southern Vietnam. (Refer to Figure 2.1 for the location of northeast Thailand and the sites mentioned in this section).

Excavations at Ban Non Wat began in 2002. Like An Sơn, this site is situated on riverine alluvium within a system of rivers within the Mun River Valley. Extensive cemeteries with mortuary traditions of the neolithic, bronze and iron ages have been reported from Ban Non Wat in association with developing stone, ceramic and metal technologies. A review of the neolithic assemblage is provided here. Painted, incised and impressed ceramic vessels are present in the neolithic layers, particularly in the burials of Neolithic phase 1, and there was a shift to highly burnished wares and some painting in the bronze age (Higham and Kijngam 2009). The Neolithic phase 2 burials contained simply decorated, cord-marked ceramic vessels, similar to those recovered from the neolithic burials at Ban Lum Khao (Higham and Thosarat 2004a). The neolithic occupation at Ban Lum Khao is discussed further in Chapter 9.

The largest quantity of stone tools was identified in the neolithic layers of Ban Non Wat. The adzes were typically small in size, either shouldered or unshouldered, and were polished and ground. The number of spindle whorls recovered from neolithic contexts was minimal in contrast to the quantity in the bronze and early iron age contexts. Ivory was minimal in the neolithic layers and the ornaments in neolithic burials were usually restricted to cowrie shells and shell beads. The more ornate shell and marble bangles and earrings appear to belong to the bronze age mortuary tradition at Ban Non Wat. Very few ceramic counters or roundels were identified in the neolithic layers, while clay pellets were common. Some sandstone whetstones were also recovered from these neolithic contexts (Higham and Kijngam 2009). Given the comprehensive excavations at Ban Non Wat, the neolithic evidence at the site offers some of the best comparative evidence for An Sơn, and for understanding occupation at this time in Southeast Asia at this time. Ban Non Wat is discussed further in Chapter 9.

North of the Mun River Valley in northeast Thailand, Non Nok Tha and Ban Chiang revealed lower layers without bronze, while the majority of the later occupation was associated with metallurgy. The Non Nok Tha burials were associated with pottery vessels, shell-disc beads, stone adzes, grinding stones, domestic cattle remains, pig remains and bivalve shells. There was no strong evidence for exotic items (Bayard and Solheim 2009; Higham and Thosarat 1998b: 82–85;

Bayard 1996, 1971). Like the neolithic burials at Non Nok Tha, those at Ban Chiang included fine pottery vessels and some jewellery items. The pottery was tempered with rice chaff and there was evidence for domestic cattle, pig and dog at the site. Fish and shellfish remains were also recovered, and deer and other small mammals were hunted (Higham and Thosarat 1998b: 87).

The pottery of Ban Chiang is well known for its painted decoration. Red-slipped vessels were identified with the later burials of the upper layers, the painted vessels associated with the earlier burials. The basal layer included cloth impressions, ash lenses and rice remains. The pottery sequence began with ceramic vessels with cord marking on the bases and burnished and curvilinear incised decorations on the shoulders. These pots with cord-marked and incised curvilinear designs sometimes had foot rings or were globular with a round base. The vessels were interred with adult burials and some contained infant remains. Superimposing the lower layer, the later pottery included incised and painted wares (White 2006, 1997, 1986, 1982; Higham 1989: 106–113; 1983; Gorman and Charoenwongsa 1976). Ban Chiang and Non Nok Tha are discussed in greater detail in Chapter 9.

Summary

The literature review has been presented to show the sites and materials that are available for comparative research. While there is inconsistent evidence for cultivation and secure radiocarbon dates are rare at the discussed sites, some broad similarities and differences between the sites can be identified from the material culture at sites that are identified with neolithic occupation. Within southern Vietnam, parallels between An Sơn and some of the sites can be identified from the literature review. This includes the adzes at Cầu Sắt, which is fitting since Cầu Sắt and An Sơn are thought to be some of the earlier neolithic sites in southern Vietnam. Similarities have also been noted between Cầu Sắt, Bến Đò, Bình Đa and An Sơn with regard to the ceramic and lithic assemblages, such as the presence of shouldered adzes. In contrast, the literature indicates Rạch Núi had greater evidence of unshouldered lithic adzes according to the literature.

Greater differences in the material culture were identified between the sites of southern Vietnam and those in central Vietnam, with the associations with sites in northern Vietnam are clearer. According to the literature, Northern Vietnam sites display vastly different material culture compared to southern Vietnam sites. This includes the presence of geometric-impressed ceramic vessels and a lack of cord-marked vessels, unlike sites like An Sơn which bear commonalities with assemblages in southeastern China and Hong Kong. Cambodian sites share some material culture in common with southern Vietnam, such as cord-marked ceramic vessels and incised and impressed sherds. Thick red burnished wares and scale pattered or 'S'-shaped incised designs on ceramics in central and northeast Thailand are distinctive, and along with red painted wares, have not been identified during the neolithic in southern Vietnam in the literature review. The coastal sites of Thailand, Khok Phanom Di and Nong Nor, demonstrate the need for detailed comparative research, since cultural variation can develop between neighbouring sites even if they may have been related groups at some stage.

Some of the sites mentioned in this chapter are referred to again in the comparisons between An Sơn and related neolithic sites (southern Vietnam in Chapter 8, and the rest of Southeast Asia in Chapter 9). An Sơn has one of the longest occupations for the neolithic of southern Vietnam, and provides an ideal site for comparative research. This monograph explores and expands on the material culture sequence at An Sơn, as previously investigated by Nishimura and others (Nishimura 2002; Nishimura and Nguyễn 2002; Bui *et al.* 1997; Nishimura and Vương 1997), and provides the findings from the 2009 excavation. There is a need to develop comparative research to establish relationships between sites within southern Vietnam with respect to inconsistencies in

the understanding of stratigraphy and chronology. Rather than only concentrating on sequence issues, this research adds fabric analyses of the pottery, discusses the usage of different spatial areas at An Sơn, examines developments in ceramic technology, and discusses the implications of both widespread and locally restricted technologies for inter-site relations.

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