Chapter 9

Returning to East Timor: Prospects and Possibilities from an Archaeobotanical Project in the New Country

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'. . . *Melanesia, with near regions of eastern Indonesia and southwestern Micronesia, is and always has been a unique region in the Austronesian pattern of diversity.*'

(Bellwood 2004: 33)

'. . . Elaborated systems of fallow and forest management in conjunction with gardens and field crops are not only widely in use today — they are also ancient.'

(Kennedy and Clarke 2004: 3)

Abstract

In East Timor's diversified subsistence economy, rice and maize are today common staples in some areas but root crops and arboriculture, too, play an important role. Although a cultural and chronometric framework for the introduction of agriculture in East Timor has long been proposed, little is known about the exact history of early plant use in the island. This paper deals with preliminary fieldwork results and the prospects of contributing to the history of plant use in East Timor through the analyses of macro-botanical remains.

Introduction

The most widely accepted model for agricultural dispersal in Island Southeast Asia, despite being focused in the north and central parts of this area, relies on several lines of evidence. The model involves the dispersal of farmer/cultivators into areas with existing hunter-gathering communities that they replaced, or absorbed as the new farming practices were adopted by existing populations (Bellwood 1997, 2002, 2004). It is implicitly assumed that the southern part of the archipelago, including East Timor, will exemplify this model. Macrobotanical remains, the direct and probably most reliable archaeological evidence of these practices, are however virtually absent from many sites to which agricultural economies are ascribed on other grounds such as presence of pottery and other 'Neolithic' artefacts (Spriggs 2003; Szabó & O'Connor 2004; Fairbairn 2005b).

Archaeological work in East Timor (Figure 9.1) was carried out in 1966 and 1967 by Ian Glover (Glover 1972a, 1986) in what was the last systematic surveying done in the former Portuguese colony. In 2000, after almost 25 years of Indonesian occupation, fieldwork was resumed by a joint project between ANU and James Cook University, in Townsville. Since then, the East Timor Archaeological Project (ETAP) has recorded and excavated sites ranging from shell middens and caves to rock art sites (Spriggs and O'Connor 2002: 50).

Macro-botanical studies in Island Southeast Asia, with the exception of the work carried out by Paz (Paz 2001) are at an early stage of development, especially when compared to work already done in adjacent areas (see, among others, Denham 2003; Hayes 1992; Kirch 1989; Matthews and Gosden 1997; Yen 1996). Glover himself presented a list of identified plants from the sites he excavated in East Timor (1986: 229). While this list provides an indication of the potential of the sites to preserve macrobotanical material, the recovery method used was not specifically aimed at the macrobotanical evidence and many genera (both trees, roots and possibly main agricultural staples), which might be predicted to occur in the region, are absent.

Fig. 9.1 Map of East Timor (GERTiL)

Between July and August 2004 I undertook a preliminary field season in East Timor, locating and testing archaeological sites in the regions of Baguia and Baucau. This paper reports to the first field season carried out during July and August 2004, the methods used in recovering macro plant remains, preliminary outcomes and the possible directions of future research. By collecting and analysing macro plant remains from some of these sites, it is hoped to make a substantial contribution to our understanding of the development of agricultural economies in East Timor and assess to what extent the Bellwood model is applicable in this part of Island Southeast Asia.

Theoretical Framework and Fieldwork Guidelines

After work carried out in East Timor by Ian Glover (Glover 1972a; 1986) and more recently by the ANU-JCU team (Spriggs and O'Connor 2002), a cultural sequence has been proposed for the introduction of agriculture between 4000 and 3500 BP. Though admittedly resulting from the survey strategy used, the many shell middens on the north coast investigated by the East Timor Archaeological Project since 2000 seem to 'represent remnants of a settlement pattern that ceases suddenly around 4000–3600 BP', probably as a consequence of a new and less mobile economy introduced by 'Austronesian-speaking Neolithic farmers' (Spriggs and O'Connor 2002: 58). This is more or less consistent with the evidence recovered from Glover's excavated caves in the Baucau plateau, where the earliest record of pottery and animal domesticates is dated to about 5000–4000 BP (ibid.1986: 197).

In his model for agriculture dispersal within the southern islands of Island Southeast Asian Neolithic, Bellwood (1997: 245) proposes that rice would have not been a major crop and Job's tears (*Coix*) and foxtail millet (*Setaria)* would have been grown alongside fruit trees and tubers. Although this might have been the case, relevant archaeological evidence in East Timor is so far scarce. As Glover himself points out, 'direct evidence for plant cultivation is not certainly present until much more recent times' (1986: 195).

Field Research in 2004

There were three main reasons why the region of Baguia was initially selected. Firstly, and with the exception of Glover's sites in Venilale, almost all archaeological work in East Timor had been carried out in coastal areas. The North coast, with its uplifted coral reef formations around Baucau and limestone formations to the East, has always attracted most attention because of its many small caves and rock shelters. These seem in many cases suitable for human occupation and are still widely used in East Timor, both as animal pens and extensions of human dwellings.

The Baucau plateau is the area where Glover did most of his work (Glover 1972 and 1986). When Glover commenced his survey project, António de Almeida, Mendes Correa and Ruy Cinatti (Almeida 1960; Corrêa, A.A.M., et al. 1964; Almeida and Zbyszewski 1967) had already carried out archaeological fieldwork along the north coast, through excavations at the Gassi Issi lagoon (East of Laga village) and at the Lene Hare cave in Tutuala. It is also in these areas, today of much easier access (GERTiL 2002: 126), that the ETAP has since 2000 been recording most archaeological sites (Spriggs and O'Connor 2002).

Secondly, we knew at least two archaeological sites existed in Baguia, one excavated by Alfred Bühler in 1935 (Sarasin 1936: 14; Glover 1972b: 120) and the other by Glover in 1966 (1972a: 56). Located in a limestone-uplifted area, on the slopes of Matabia mountain (which raises 2370 m above sea level), it was thought this would be a potential area to find caves and shelters with early human occupation.

And thirdly, this is an area where Makasae, a non-Austronesian or Papuan language (Hull 2004), is dominant. There is as yet no linguistic information on its antiquity and little or no archaeological information in East Timor to correlate that with. However, according to some authors, the Papuan languages spoken in East Timor fit within the Trans New Guinea phylum group of languages and may have been introduced before the Austronesian languages (Pawley 2006). Pawley has even suggested that agriculture may be the prime mover for the spread of this group of languages, both within New Guinea and from there into places such as East Timor (Pawley 2006).

Moreover, O'Connor has reported the presence of a marsupial cuscus (*Phalanger orientalis*) in Matja Kuru 2 cave, near Tutuala, in levels dated to around 9000–10,000 BP (O'Connor, this volume). Glover too, had found evidence of cuscus in horizons III and IV of Uai Bobo 1, dated to about 2600–3800 BP and 2200 BP, respectively (1986: 159), and in horizon VII of Uai Bobo 2, dated to about 5900 BP, although he mentions that this is one of the mammal species that appears in the sequence 'about the same time as pigs and pottery' (1986: 192).

The presence of this species in East Timor can only be due to human translocation from the Aru Islands or New Guinea to the east, in which case it marks an episode of human dispersal from that island into East Timor early in the Holocene.

Surveying and Test Excavations in Baguia

Baguia is a subdistrict within the Baucau district, located on the southern slope of Mount Matabia. This region is topographically diversified, mountainous with clusters of houses and small villages scattered along steep hillsides and within high valleys, and an area of lowland rice-paddies, along the Larisula stream draining to the south coast.

The region of Baguia was extensively surveyed during six weeks. Several small caves and overhangs were visited, many of them visibly unsuitable for human occupation but still used during the Indonesian occupation as refuges. As the local concept of time depth differs greatly from our own, many sites referred to as 'old' and 'sacred' by local people have only been so for the past 30 years. The history of these — in most cases — more recent sites should in any case be told, as they hold important ethnographic information on the recent use of caves and shelters in this area. Sites where surface finds were recovered (chert flakes and/or pottery) are shown in Figure 9.2. Several other caves, overhangs and cliff walls were visited but as no surface finds were found they will not be mentioned.

Two small test pits were carried out in this region. The first was dug at Maulora Uasa, a small overhang located near Aiafa (Saelari), not far from Baguia village (Figure 9.3). As there are no published pictures from Bühler's 1935 excavations (Sarasin 1936), it was not possible to discern if this was the same site he excavated or a previously unrecorded site. However, according to Sarasin's article describing Bühler's excavation (1936: 14) and Glover's description of his own short visit to Bühler's site in 1966 (1972b: 57), it would not seem to correspond to any of the caves and overhangs I visited.

Maulora Uasa is a 25 m long by 6 m deep overhang, facing east and located at about 440 m above sea level. It is currently used as a goat pen. A 50 cm by 50 cm test pit was dug on the 29th and 30th of July, using a combination of arbitrary spits and natural layers. Arbitrary spits were 5 cm depth removals. Analysis of excavation profiles did not allow sufficient stratigraphic differences to be distinguished during excavation, therefore the 5cm spits were maintained to a depth of around 40 cm.

Small sherds of earthenware and chert flakes were found in all eight spits and the base of the deposit was not reached. Since the aim of this research project is to examine the transition to agriculture from an archaeobotanical perspective, much effort was put into systematically recover plant remains using bucket (or manual) flotation and wet sieving with a 1 mm mesh sieve (Fairbairn 2005). All the sediment — around 10 litres per spit — was floated through fine chiffon material and wet sieved with a 1 mm mesh screen, in order to recover any charcoal or seeds (Fairbairn 2005). A soil sample from each spit was also kept for future pollen and phytolith analyses.

Although both the area and depth of the excavation were too small to infer any relevant conclusions, almost no charcoal was preserved in any of the spits excavated, thus hindering the possibility of conducting any macro botanic analysis.

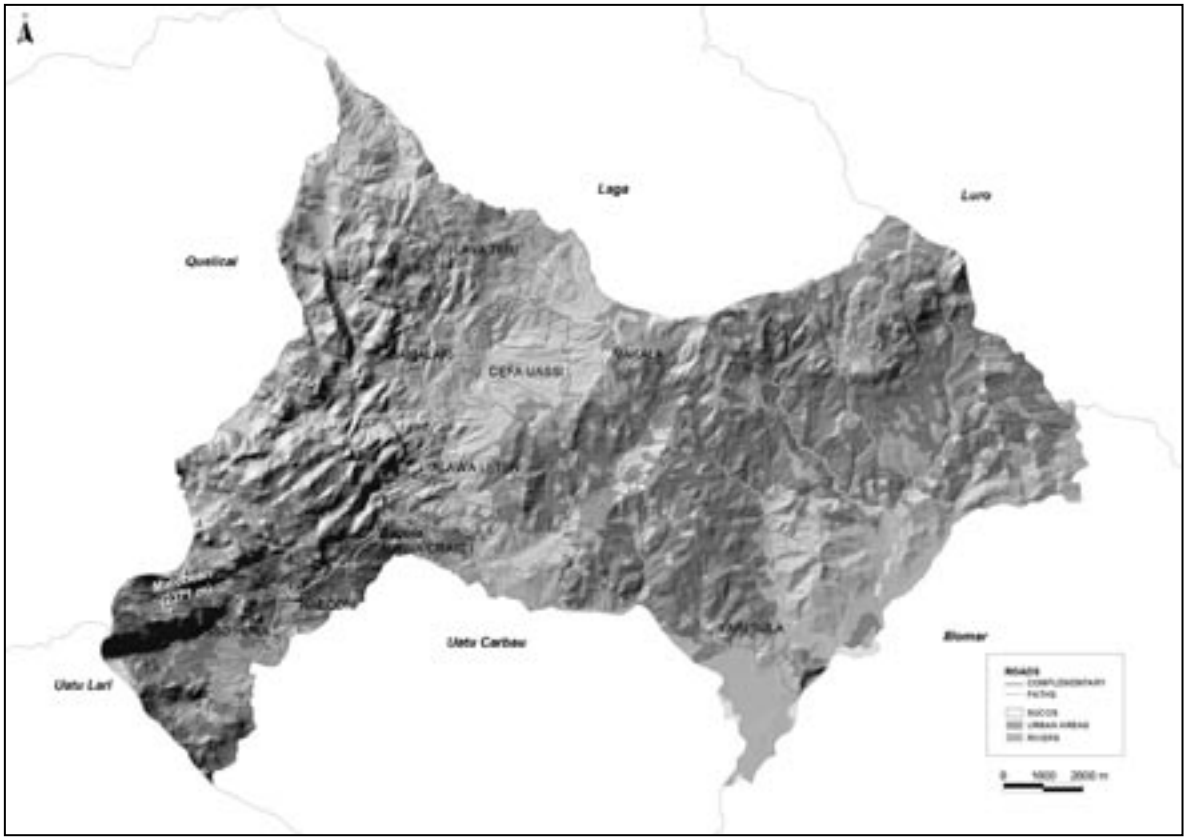

Fig. 9. 2 Sites with surface finds in Baguia Subdistrict mentioned in the text (GERTiL)

Fig. 9. 3 Maulora Uasa rock shelter, Saelari, Baguia.

Preliminary pollen (from spits 3, 4, 5, 6, 7 and 8) and phytolith analyses (spits 5, 6, 7 and 8) were conducted on the soil samples retrieved. Results of the pollen transect conducted by Janelle Stevenson are shown in Table 9.1. Pollen was poorly preserved, either completely absent (spits 4, 5 and 7) or reduced to single and inconclusive specimens of grass and shrubs (spits 3, 6 and 8).

Table 9.1 Results from Pollen transect from Maulora Uasa, Baguia (20x magnification)

Spit	Depth in cm	Identified species' units
3	0–15	1 Poaceae, 1 Cheno
4	15–20	X
5	20–25	X
6	25–30	1 Poaceae, 1 Cheno
7	30–35	X
8	35–40	2 Acacia

Phytolith slides were prepared and a preliminary analysis has shown evidence of phytoliths in all 4 spits. However, as the excavation suggested poor potential for macrobotanical recovery it was decided not to proceed with further testing in this region, and no phytolith identification has been carried out.

Fig. 9. 4 Madalia cave, Iarbau, Baguia.

During the time spent in Baguia, another small test pit was dug in a solution cave called Madalia (Figure 9.4), near Iarbau, and some 5 km from Baguia along the road to Uato Carbau. This cave, located 920 m above see level and facing northeast, would appear to be the same one that Glover test pitted in 1966 (1972a: 56). Glover reports having found very little evidence of human occupation but excavated only to 20 cm deep, due to a 'solid sheet of travertine' (1972a: 57). This cave has a main gallery at the entrance and several smaller wetter galleries inside, where stalactites are actively forming. Again, a small test pit of 50 cm by 50 cm was located near the front entrance. Because this cave is still geologically active, the test pit was located in an area protected from water flow from inside the cave. Despite this precaution and in spite of the fact that the cave has a small stonewall at the entrance, no single piece of evidence of human or even animal occupation was found, and excavation of the sterile sediments was discontinued at a depth of 40 cm.

Baucau

As mentioned before, the Baucau region (Figure 9.5) is where Glover had undertaken the majority of his fieldwork in the 1960s. His research here comprised a series of test pits and excavations both near the coast, in the Baucau sub district, and in the interior, near Venilale (Glover 1972a, 1986). The Baucau raised coral reef plateau extends 20 km inland from the sea, sloping until the base of the central mountain chain and reaching there around 600 m above sea level (GERTiL 2002). Rock shelters and caves here formed in the vertical faces of the sequential uplifted terraces.

Beside those sites recorded during Glover's reconnaissance, O'Connor had also located several other cave sites in this area during two field seasons in 2002 (Pannell and O'Connor 2005, and O'Connor 2002 fieldnotes). We relocated some of these sites prior to the Baguia surveys and following the fairly poor prospects for macrobotanical recovery in that area, it was decided to dig a small test pit in one of the most prospective Baucau shelters. A small excavation was thus conducted in a cave in close proximity to Glover's Bui Ceri Uato.

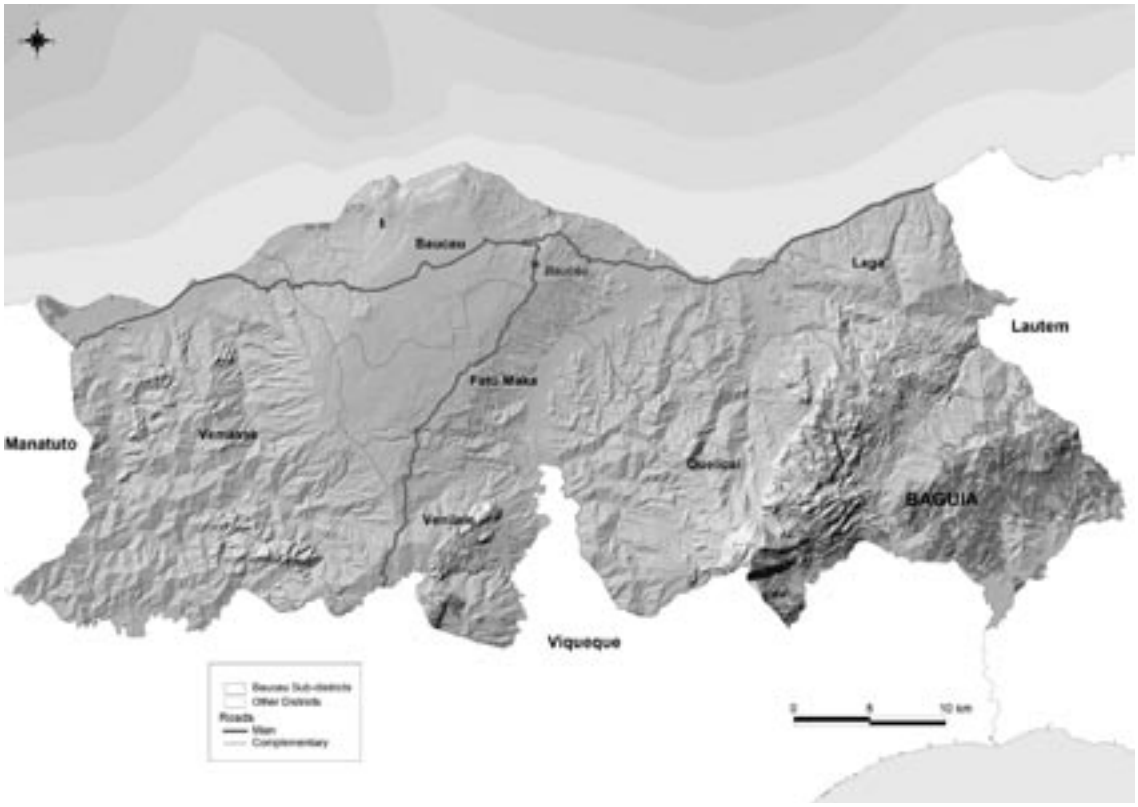

Fig. 9. 5 Location of Bui Ceri Uato Mane rock shelter in Baucau District (GERTiL).

This cave (Figures 9.6 and 9.7), known locally as Bui Ceri Uato Mane[1] is 30 m long by 6 m deep, and is located some 300 m South of Osso Ua Uaisa village (Kaisido area) and 187 asl. A 50 cm by 50 cm test pit was dug between the 14 and 15 of August, using the same approach as in Baguia (i.e. with 5 cm spits combined with the natural stratigraphy, floating and wet sieving of all sediment). Sediment samples were retrieved from every spit.

Fig. 9. 6 Bui Ceri Uato Mane rock shelter, Osso Ua Uaisa, Baucau.

Fig. 9. 7 Inside Bui Ceri Uato Mane rock shelter, Osso Ua Uaisa, Baucau.

The first 30 centimetres of deposit mainly comprised alternating layers of charcoal, ash and consolidated topsoil, in what apparently were 3 successive fire episodes, each on top of the other. Since the excavated area was small, it is not yet possible to confirm their exact use but it is probable that they correspond to a sequence of burnt animal dung layers. Spit 6 had two post hole features, one of which contained part of an unburned post *in situ*, possibly the remains of an old cereal drying rack that may have been in use until recently.

Only from spit 7 downwards did pottery, stone artefacts and marine shell finds start to appear consistently. The sediment from spits 7 to 10 (the lowest excavated unit, at a maximum depth of 53 cm) looked very similar, however this should be confirmed in 2005 when the excavation area is enlarged.

Charcoal remains were recovered from every spit, with considerable amounts in spits 7, 8, 9 and 10, immediately beneath the burnt layers. The amount of charcoal found in Bui Ceri Uato Mane is encouraging and should enable macro botanical analysis to cast light on the issue of plant use at this site. However, at the time of writing the separation and analysis of wood charcoal from fruits and seeds had only just commenced.

As with the excavated site in Baguia, pollen and phytolith analyses were also conducted, in this case in soil samples from all ten spits excavated. Results of the pollen transect conducted by Janelle Stevenson are shown in Table 9.2. As in Maulora Uasa, pollen was poorly preserved and held no relevant information. Spits 2, 3 and 4 had no evidence at all, and apart from a single specimen of a palm pollen in spit 8 and *Myrtaceae* in spits 1 and 10, all the rest is grass, grass-like or shrubs.

Table 9.2 Results from pollen transect from Bui Ceri Uato Mane, Baucau (20x magnification)

Spit	Depth in cm	Identified species' units
1	0–5	10 grass, 1 Myrtaceae 3 unidentified
2	5–Oct	X
3	Oct–15	X
4	15–20	X
5	20–25	sample was lost during preparation and not replaced
6	25–30	1 grass
7	30–35	2 grass, 1 Cyperaceae (?), 1 fern spore
8	35–40	1 palm, 1 grass, 2 unidentified
9	40–45	1 Casuarina, 2 grass, 1 unidentified
10	45–50	1 Poaceae, 6 Myrtaceae, 1 fragm. Convovulaceae/Malvaceae

The phytolith slide preparations all show preserved phytoliths when observed under 20x magnification, although no detailed identification has yet been carried out. Further excavations are planned in 2005 at Bui Ceri Uato Mane and phytolith analyses will be conducted in order to address the question of the exploration of early plant use and the transition to agriculture in East Timor, as well as questions related to evidence for environmental change on the Baucau plateau.

Plant Remains Recovered During Glover's 1967 Excavations

The cave sites investigated by Ian Glover in the Baucau plateau all had pre-ceramic layers and plant remains were recovered in most excavated units and/or spits. Candlenut (*Aleurites moluccana*) was the most common and was present in all sites, possibly reflecting, as Glover commented, a preservation bias (1986: 160). *Celtis sp.* was also very common, stated by Glover to be most towards the base of all the deposits but not found in the most recent layers, at least not at Lie Siri and Uai Bobo 2 (1986: 80). Interestingly, this has also proved to be the pattern in other cave sites in the wider region, such as Pamwak on Manus Island, Papua New Guinea (Spriggs 2001).

Glover felt that *Celtis* may have been harvested long before agriculture was introduced in East Timor (1986: 212). As for *Inocarpus*, it is both referred to as being used earlier with *Celtis* (Glover 1986: 212) and post 3000 BC (Glover 1979: 18), possibly reflecting some doubt based on the different status of the few remains identified ('good' in the horizon dated to around 1500 BP and 'possible' in the one dated to around 6600 BP). Other fruits as *Piper betel* and *Coix lachryma-jobi*, also occurring in some of the deepest excavated layers (the first in horizon II dated to about 11,400 BP, and the second from horizon I dated to about 14,800 BP, both in Uai Bobo 2), are thought to have been simply collected and used, not cultivated (1986: 212). From layers post dating 5000 BP *Bambusa*, *Lagenaria* and *Setaria* (from horizon X in Uai Bobo 2, dated to around 3500 BP with a tentative identification by Yen), and *Prunus*, a *Cucurbitaceae*, *Cocos*, *Cocculus*, *Annona* and *Garcinia* (Glover 1979: 18 and 1986: 230).

The most striking feature in this list is the absence, apart from *Aleurites* and *Inocarpus*, of some plants that could be expected in the root cropping and arboriculture subsistence economies (Latinis 2000), the first in use in New Guinea since the mid-Holocene (Denham 2004) and the second known in different parts of Southeast Asia, New Guinea and Near Oceania probably long before that (Spriggs 1997: 85). It must be remembered, however,

that in his excavations Glover used a combined method of stratigraphic units and 10 cm spits (1986: 26), no flotation system was employed and only dry sieving was carried out using 6 and 3 mm screens (Glover 1986: 25). Material smaller than 3 mm would therefore not have been recorded.

Archaeobotanical Reference Material

Glover mentions the lack of reference plant material in East Timor (1979: 18), but Cinatti (1950) listed several ethnobotanical surveys undertaken in East Timor since the early nineteenth century and he, himself made ethnobotanical collections, sending plant material to Lisbon, Java and to the National Herbarium in Melbourne (1950: 48). This being so, there should be collections both in Australia, Portugal and other European countries.

The Tropical and Scientific Research Institute, in Lisbon for instance, has a small herbarium with c. 1000 collected plant specimens from Timor and it is hoped that the Australian National Herbarium (now in Canberra) will provide assistance in building a new reference collection (at least with species useful for archaeological research), as part of the existing collection strategy developments at ANU. Although most ethnobotanical collections do not contain seeds or tubers, they may provide relevant information on the identification of modern species with economical use still existing in the area under study.

Discussion and Conclusion

As mentioned before, it was decided that no further fieldwork would be done in Baguia in 2005. Although several sites were recorded and test pits and resulting sample sizes were small, the excavations produced no, or very few, macrobotanical remains. As the main focus of this project is to document early plant use through macrobotanical analyses, effort will be put only onto the Baucau sites where greater quantities of such remains are expected to be found.

At Bui Ceri Uato Fetu, Glover recorded a very high density of stone artefacts and shellfish, which Veth et al. (2005: 181) believe is related to a more permanent site, possibly integrated in a village complex adjacent to the nearby freshwater spring. Although Bui Ceri Uato Mane is a cave site, it may be that evidence of a wide range of subsistence activities, including agriculture, would be recorded there. Aside from extending the excavation area in Bui Ceri Uato Mane, it is planned to do smaller test excavations outside the cave in an attempt to test the hypothesis of this being part of a village complex.

Glover (1986: 96) did not obtain radiocarbon dates consistent with the stratigraphic sequence at Bui Ceri Uato. Nevertheless, the similarities between the cultural sequence on this site and the others he excavated where the dates were internally consistent led him to argue that an analogous sequence could be proposed for Bui Ceri Uato (ibid. 97). Recent dating of marine shell obtained from the basal layers of Bui Ceri Uato has returned Pleistocene dates and hence prompted a thorough re-evaluation of this site (Helen Selimiotis: MPhil in progress, pers. comm.).

Kennedy and Clarke (2004: 2) argue that even today it is never easy to differentiate most 'domesticated or maintained trees' from their wild counterparts. Fairbairn (2005: 491) shares a similar opinion. Many plants are barely visible in the archaeological record and this does not only affect tree crops. Plants such as *Colocasia esculenta*, *Metroxylon sagu*, *Dioscorea spp.*, *Musa spp.*, *Pandanus spp.* and *Artocarpus altilis* still make an important dietary contribution in many villages in the Pacific and Island Southeast Asia, either as main components or as part of an economic system where rice is also present. Rice itself, today one of the most common agricultural crops in East Timor, has yet no archaeological evidence at all to date its arrival in the island.

Although some present day staple crops were certainly introduced, we know as yet too little to state when and how they came to the island. According to the archaeological record, something seems to have definitively changed around 4500–3500 BP (Spriggs and O'Connor 2002) but to what extent that was due to the arrival of Austronesian speaking communities practising agriculture we do not know.

The model proposed by Bellwood (1997: 245) on the prehistory of Austronesian cereal cultivation mentions, regarding eastern Indonesia — and, by extension, East Timor — *Coix* and *Setaria*, together with other fruits and tubers as early crops. However, only one seed of *Coix* is present in one of Glover's sites at around 13,800 BP and *Setaria*, as noted before, was tentatively identified in a layer date to about 3500 BP (1986: 229). Although these plants may precede Bellwood's Austronesian expansion, it must be said that the available information is rather scanty.

When agricultural practices are referred to in much of the available literature it is generally implicit that domestication is to some extent involved, which in the case of many trees may not necessarily be true (Kennedy

and Clarke 2004; Latinis 2000; Fairbairn 2005). Due to lack of direct evidence, 'agriculture' is often ascribed on the basis of non-plant proxies, such as the presence of animal domesticates or certain artefact types, language reconstructions and others (Spriggs 2003, Fairbairn 2005). Systematic flotation and wet sieving are thus seen as essential to recovering direct macrobotanical evidence that will enhance our knowledge of both early plant use and landscape reconstruction around excavated sites. This evidence will also help to understand better possible routes for agricultural dispersal and/or in-place developments.

On the basis of identified macrobotanical remains solely, East Timor does not yet support the case for an Austronesian replacement and/or adoption of agricultural practices by previously in-place communities. Other proxies exist but they are not conclusive, as they are neither very relevant in quantity terms (as with the case of red-slip pottery) nor exclusive as an Austronesian characteristic (as with animal domesticates). Concepts of population movement and linguistic dispersal derived from an archaeological record that barely speaks for itself in terms of the plant record, should therefore be regarded with caution (Szabó & O'Connor 2004) and not adopted *a priori*, especially when individual lines of research still have a long way to go.

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Notes

[1] *Uasa* is the Makasae word used for a cave; unfortunately, its use is very generalised and may also refer to wall, cliff, hole, etc. Many places termed *uasa*, were visited but had little of archaeological interest. *Mane* means 'male; in Tetum. Glover's excavation took place in Bui Ceri Uato *Fetu*, the slightly smaller "female" cave. This sexual dualism applied to landscape features is recurrent in east Timor. Glover recorded this site at 175 asl based on the Portuguese 1:50,000 maps.

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