This research seeks to understand the human-landscape relationship, with particular attention paid to the plant foods exploited, in parts of Tivland, in the Middle Benue Valley in north-central Nigeria. The focus of this research utilises an environmental archaeological approach which includes (a) reconstruction of the vegetation and soil histories of parts of the Tiv-dominated areas in the Middle Benue Valley, and (b) deciphering the dynamics of farming, the types of crops utilised as well as the impact of human activities on the Middle Benue Valley landscape during the Late Holocene. A third focus was to shed light on the life ways in the hill tops compared with those in the valley. In Nigeria, scientific studies on ancient food producing societies and crops are few and far between; often the historiography of food production and/or farming has only been understood from oral history without empirical data (Andah, 1983, 1998). The Tiv, linguistically classified as Bantoid (Blench, 2014), are a society known for their farming prowess especially yam production, and complex decentralised social organisation (Bohannan, 1954a, b). It has been opined that early Bantoid groups were accomplished farmers (Blench, 1996, 2014; Bostoen, 2014). However, what constituted their earliest food crops as well as their farming strategies is hazy.

There are several ethnic groups in the Middle Benue Valley but the Tiv are one of the most dominant. In the 2006 Census, they were 2.9 million (Ujoh, 2014) and are regarded as the fourth largest ethnic group in Nigeria. Unconfirmed estimates put the current figure between 3.5 and 5.6 million speakers. Most of the Tiv people are found in Benue State, Makurdi and Gboko are their major towns (Figure 1). They are also found in neighbouring States such as Nasarawa, Plateau, Taraba, Cross River and parts of the Federal Capital Territory (FCT), Abuja. It is believed, based on oral history and material culture associated with the Tiv (Folorunso, 1998, 2006; Ndera, 2013; Ogundele, 1990, 2005) that on arrival in Middle Benue Valley probably around the thirteenth-fifteenth centuries AD, the Tiv met some autochthonous populations, possibly the Etulo and/or Idoma, whom they engaged in warfare. Archaeological studies in the Tiv area revealed that early human occupation of the area occurred on hill tops. These first phase occurred on Tse Dura rock shelters near Ushong from a period just before ca 2300 BP to 1100 BP (Andah, 1983) after which the people descended onto the plains. The identities of these humans are yet unknown. A second phase occurred during the thirteenth-fifteenth centuries AD, when several hill settlement sites such as Ushongo, Bindu, Mata and Mker were occupied (Andah, 1983; Folorunso, 1998; Gundu, 2013). The material culture links these humans with the Tiv (Folorunso, 1998; Gundu, 2013). In both instances, the environmental dynamics during the period of human occupation and their roles in limiting or shaping the choices of humans are unknown. In addition, the ranges of plant foods and resources exploited in the hills, how and why they differ from those from the valley have not received much attention.

Methodology and Fieldwork outline

The study area comprises Ushongo and Katsina Ala in Benue State, north-central Nigeria (Figure 1). We conducted surveys and archaeological excavations in ancient settlement sites on a hilltop and in the valley in two field seasons (2016 and 2017). The hilltop site is Tse Dura rock shelter 1, a Later Stone Age (LSA) archaeological site located in Tse Dura village which is about 1km south-east of Ushongo town. It was selected because of its antiquity and potentials which offer opportunities for providing a deeper chronology of early human-environment interactions in the area. The other sites are ancient settlement compounds in the valley in Ushongo and Katsina Ala (Akwadam). These settlements are recognised in the
oral traditions as some of the earliest occupied after the people descended from the hills. They therefore offer the potentials for comparing with data from the hills. In Us-hongo, we identified Tse Aben, Tse Agwa and Tse Azenda settlement sites while in the Akwadam area of Katsina Ala, Tse Fayum and Isaiah Fayum were identified. Two and nine archaeological units were opened in Tse Dura rock shelter 1 and the valley respectively. Of the latter, three were opened in Tse Agwa (T Ag 1-3), two in Tse Azenda (T Az 1-2), one in Tse Aben (T Ab1), while one and two were opened in Isaiah Fayum (ISF 1) and Tse Fayum (TF 1-2) respectively. These units in the Valley were refuse mounds except Tse Fayum (TF 1) and Tse Azenda 1 (T Az 1) which were sacred/ritual sites.

<table>
<thead>
<tr>
<th>Sample</th>
<th>Source</th>
<th>Depth</th>
<th>C14 Age</th>
<th>2 Sigma Cal (95% Probability)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beta 444814</td>
<td>Sediment core</td>
<td>55cm</td>
<td>310 ± 30 BP</td>
<td>cal AD 1485-1650</td>
</tr>
<tr>
<td>SUERC-73889</td>
<td>Tse Dura RS1</td>
<td>60-70cm</td>
<td>802 ±29 BP</td>
<td>cal AD 1274</td>
</tr>
<tr>
<td>SUERC-73890</td>
<td>Tse Dura RS1</td>
<td>100-110cm</td>
<td>933 ± 29 BP</td>
<td>cal AD 1161</td>
</tr>
</tbody>
</table>

Table 1: Radiocarbon dates from Benue Valley, north-central Nigeria.

Figure 1: Map of the Benue Valley showing the study area.
We floated soil samples for macrobotanical remains from all the excavated units. We also collected pollen samples at 5cm intervals from the walls of five units; these are the two units in the Tse Dura rock shelter (Tse Dura RS 1, B 1 and B 2) and one each in Tse Agwa (T Ag 1), Tse Aben (T Ab 1) and Isaiah Fayum (ISF 1). In addition to the pollen samples obtained from the test units, we collected samples from two sections (2.35m and 1.1m) in the Katsina Ala River floodplain (KARF). In addition, a sediment core (55cm in depth) (KA SC) drilled in the swamps of the same river below a water column of 30cm was also sampled for pollen. The Katsina Ala River site is significant because it is located about 1km from Katsina Government College where several terracotta figurines and pottery with imprints of netting/woven fabric distinct to the area dated to 400 ±125 cal. BC were recovered between 1951 and 1963 (Fagg, 2014). We also obtained block samples for soil micromorphology from the walls of Tse Dura RS 1 B1, Tse Agwa (T Ag 1) and the 2.35m thick section of the Katsina Ala River floodplain (KARF). AMS dates were obtained from Beta Analytic and SUERC laboratories (Table 1).

Results and Discussion

Tse Agwa

We sunk a 3 x 2 m unit (T Ag 1) on a refuse mound in Tse Agwa; the mound was about 50cm high from the ground. We also sunk two 1 x 1 m units (T Ag 2 and T Ag 3) to the south east of the main 3 x 2 m unit. The T Ag 1 unit was taken down to a maximum depth of 113cm upon which the sterile layer was reached; units T Ag 2 and T Ag 3 reached depths of 38cm and 40cm respectively. Seven stratigraphic layers were identified in T Ag 1. In contrast, two stratigraphic layers were identified in T Ag 2 and T Ag 3. A diverse array of archaeological materials namely pottery (decorated and undecorated) and non-pottery finds (animal and fish bones, beads, charcoal, iron slag, smoking pipe and hammer stones) was recovered from the three Units. The commonest materials were pottery, slags, animal bones and macrobotanical remains. A total of 533, 23 and 60 pot sherds were recovered from Tse Agwa Units 1, 2 and 3 respectively. The most dominant pottery motif was knitted mat-impression; others were corn cob roulette, carved wood roulette, single string roulette and wavy lines; plain pottery was also present.

Tse Azenda

It is located at the foot of the Ushongo hills; these hills served as a fortress to the Tiv when they were invaded by the Ugenyi (Folorunso, 1998). Upon descent from the Ushongo hills, Tse Azenda was one of the earliest settlement sites founded in the area. Hence, it was thought that excavating areas directly below the hills and further in the plains could shed light on the early life of the Tiv people during that period. After survey, two sites were selected for excavation, (a) a ritual (Akombo) site (T Az 1) and (b) a refuse mound (T Az 2) located just outside the compound of Mr Tkyernum Jagudu. Units T Az 1 and 2 were 73cm and 57cm in depth respectively. The stratigraphy of both test pits is similar in that they both
had four layers. The total number of pottery recovered in Units T Az 1 and T Az 2 was 103 and 14 respectively. The recovered finds are generally similar to those from Tse Agwa. In terms of pottery decoration, the knitted mat-impressed pottery dominated. A unique feature of these units is the predominance of eroded pottery.

Tse Aben

Tse Aben is located near the compound of the Tyoor (Chief) of Ushongo. We sunk a 2 x 2m Unit at the top of the mound; excavation continued until a sterile layer was reached at a depth of 135cm. We identified six layers A-F; the materials from this Unit have not been analysed however, the most significant materials we recovered included bottles, plastic containers, metal objects, grinding stones, smoking pipe and flat beads of various colours. It also contained abundant animal bones, snail shells and charcoal. Pottery was also abundant; the perforated type (buufi in Tiv) being one of the most predominant. This pottery type is traditionally used for drying meat and cleaning the seeds of locust bean (Parkia biglobosa).

Tse Fayum

Tse Fayum, named after Fayum Zaki, is in the Akwadam area in Katsina Ala. Fayum Zaki was a seventh-generation son of Akwadam, a warrior of repute in Katsina Ala. It is one of the ancestral settlements in the area; this compound is ca. 400m to the north-west of the Katsina Ala River. We opened a 2 x 1m unit at 2m distance from a Bombax costatum tree and a 1 x 1m unit at a refuse mound located ca. 80m south-west of the first Unit. The first Unit, Tse Fayum 1 (TF 1), reached a depth of 45cm upon which a sterile layer was struck. We identified two stratigraphic layers from which very few amount of pottery (14) was recovered. The non-pottery finds included charcoal, stones and rice husks. The second Unit Tse Fayum 1 (TF 1) reached a depth of 165cm; five stratigraphic layers were identified; pottery finds were 46, and were dominated by knitted mat impression.

<table>
<thead>
<tr>
<th>Artefacts/Level</th>
<th>Surface</th>
<th>0-10</th>
<th>10-20</th>
<th>20-30</th>
<th>30-40</th>
<th>40-50</th>
<th>50-60</th>
<th>60-70</th>
<th>70-80</th>
<th>80-90</th>
<th>90-100</th>
<th>100-110</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pottery</td>
<td>228</td>
<td>103</td>
<td>180</td>
<td>638</td>
<td>1009</td>
<td>429</td>
<td>115</td>
<td>48</td>
<td>133</td>
<td>16</td>
<td>27</td>
<td>16</td>
<td>2942</td>
</tr>
<tr>
<td>Animal Bones</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>15</td>
</tr>
<tr>
<td>Animal Teeth</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Bone Tool</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Charcoal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Charred Wood</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>7</td>
</tr>
<tr>
<td>Groundnut Shells</td>
<td></td>
<td>7</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8</td>
</tr>
<tr>
<td>Iron Slag</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>326</td>
</tr>
<tr>
<td>Lithics</td>
<td></td>
<td>2</td>
<td>53</td>
<td>223</td>
<td>60</td>
<td>151</td>
<td>51</td>
<td>72</td>
<td>-</td>
<td>4</td>
<td>1</td>
<td>617</td>
<td></td>
</tr>
<tr>
<td>Elaesis guineensis</td>
<td></td>
<td>9</td>
<td>21</td>
<td>3</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
<td>33</td>
</tr>
<tr>
<td>Seed</td>
<td></td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td><strong>248</strong></td>
<td><strong>371</strong></td>
<td><strong>183</strong></td>
<td><strong>740</strong></td>
<td><strong>1250</strong></td>
<td><strong>495</strong></td>
<td><strong>277</strong></td>
<td><strong>105</strong></td>
<td><strong>214</strong></td>
<td><strong>18</strong></td>
<td><strong>35</strong></td>
<td><strong>17</strong></td>
<td><strong>3953</strong></td>
</tr>
</tbody>
</table>

Table 2: Summary of materials recovered from KA4 RS 1 B1.
Mr. Isaiah Fayum

Mr. Isaiah Fayum is a direct son of Fayum Zaki after whom Tse Fayum is named. Isaiah Fayum’s compound is located ca. 300m away to the north-west of Tse Fayum. After gridding, we opened a 2 x 1m unit near where a sleeping hut and kitchen once stood. The 2 x 1m unit reached 103 cm in depth. We identified six stratigraphic layers; the materials recovered included pottery, animal and fish bones and some plant remains. Pottery finds were 25 and were dominated by knitted mat impressed pottery.

Archaeobotany

We identified the remains of twenty-three plants (Table 2). The most common plant remains were those of *Elaeis guineensis* (oil palm) and *Sorghum bicolor* (Guinea corn); others included *Arachis hypogea* (groundnuts), *Citrullus* sp. (melon), *Vigna* sp. (cowpea), *Pennisetum glaucum* (pearl millet), *Prosopis africana* (African mesquite), *Parkia biglobosa* (Shea butter) and *Carica papaya* (Pawpaw). We also recovered charcoal particles of three plants namely *Pterocarpus santalinoides*, *Hymenocardia acida* and *Spondianthus preussii*. In addition, we recovered parenchyma cells which occurred throughout all the Units. The structural similarities between these parenchyma cells and those of modern samples of yams (Oliveira, 2012) suggest that they might probably be those of *Dioscorea* spp.

Cultural sequence

Based on the material culture recovered from the excavated settlement sites in the valley, we identified two informal cultural phases, I and II. In both phases, the knitted mat impressed pottery was the most dominant. Other decoration types included twisted cord roulette and single string roulette. Phase II had the decoration types which occurred in Phase I but pottery with burnish finish, perforations, wavy lines, multiples of corn-cob, corn ear and herringbone decorations were identified. In addition, we recovered European smoking pipes from this phase; European pipes are associated with the Trans-Atlantic slave trade which occurred in West-Central Africa during seventeenth-nineteenth centuries. Therefore, it serves as a *terminus post quem* for Phase II. Non-pottery materials included beads, hammer and grinding stones, iron slags and animal and fish bones. Fish bones were more prominent in Phase I while animal bones dominated in phase II; the fish was mainly the *Clarias* sp. type while the animals ranged from cow, goat, pig, chicken, rat, frog/ toad to bivalves.

Geoarchaeology and Palynology

**Geoarchaeology (soil micromorphology)**

Based on soil micromorphology, we identified four phases (I-IV) of environmental change namely I (235-195cm), II (195-135cm), III (110-60), IV (60-0cm) in the freshwater and floodplain of Katsina Ala River. The coarse-fine sediments of phase I (layers A-B) indicated soil breakup possibly arising from disturbance; however, the occurrence of pure-weakly dusty channels indicated long-term stability and humid and/or wet conditions. The reddish brown fine-grained clay (layer C) of Phase II indicated episodic deposition of sediments as well as repea-
tated influx of slow moving water from the River onto the floodplain. In phase III (layer D), sediments were highly organic and stable which suggested that the soils were not actively utilised while in phase IV (layers E-F) the coarse-fine brownish-coloured soils and comparatively less organic sediments indicate greatly disturbed and/or disorganised soils.

**Palynology**

*Data from Tse Agwa Excavation:* We identified three phases based on changes in the pollen assemblage and lithology of the sediments but all manifesting human influence: (a) phase I was dominated by grasses and herbs; (b) phase II was dominated by economic plants such as *Dioscorea* sp., *Elaeis guineensis*, *Alchornea* sp., *Celosia* and *Poaceae* while (c) phase III was dominated by cultivars, exotics (*Mangifera indica* and *Citrus* spp.) and fungi associated with fruit trees.

*Data from Katsina Ala freshwater and floodplain:* We identified five phases (early, middle, hiatus, transition and latest) of environmental changes. In the early phase (235-195cm), the environment was a complex of Guinea savanna and freshwater swamps. In the middle (195-135cm) and transitional (110-60cm) phases, conditions were dry, and the environment was more open and cooler; there is evidence of human impact in the form of unprecedented increase in charred plant remains, and the pollen of weeds and *Elaeis guineensis*. We identified a hiatus (135-110cm) in the sediments of the 2.35m thick section; the sediments were very compact, yellowish brown in colour and lacked palynomorphs. It is thought this was a period of low river discharge and dry conditions which resulted in post-deposition destruction of palynomorphs. The impact of this environment change on human populations in the Benue Valley is yet uncertain. In the latest phase (60-0cm), dated to cal. AD 1485-1650 (Table 1), the dominance of aquatic plants reflected humid environmental conditions; cultivation was centred on *Dioscorea* spp. (yams), *Sesamum* cf. *indicum* (sesame) and *Manihot esculentus* (cassava/manioc).

*Data from Tse Dura rock shelter RS 1:* We recovered a diverse array of macrobotanical remains the most significant of which were domesticated grains of *Pennisetum glaucum* (pearl millet) (Figure 3) and *Sorghum bicolor* (Guinea corn), and parenchyma cells of what appears to be *Dioscorea* (yams) (Table 2). We also recovered 2,942 and 6,138 pot sherds from units B1 (Table 3) and B2 respectively.

**Cultural sequence**

Based on the material culture from both units in the Tse Dura rock shelter, we identified four cultural phases I, II, III and IV. In Phase I (ca. 1500-933 ±29 BP [cal AD 1161]), the occurrence of microliths indicated that the inhabitants of the rock shelter were hunter-gatherers. We recovered pieces of iron slag and substantial amount of charcoal which suggested the occupants engaged in iron working and use of fire. Pottery was dominated by knitted mat impressions. In phase II (933 ±29-802 ±29 BP [cal AD 1274]), there were increases in artefacts particularly pottery and iron slags; knitted mat-impressed pottery remained predominant but other pottery decoration types such as finger impressions, burnished, twisted cord roulette, embossed and perforated pottery appeared. In phase III (802 ±29 BP - 310 ±30 BP [cal AD 1485-1650]), knitted mat impressed pottery remained the most dominant; however, we identified increases in burnished sherds with knotted strip roulette. Tubers (cf. *Dioscorea* spp.) and *Pennisetum glaucum* remained the dominant plants managed; charred grains of what might be *Sorghum bicolor* appeared during this phase (Table 2). In the final phase (310 ± 30 BP- Present), knitted mat-impressed pottery remained dominant but burnished pottery increased substantially; pottery with maize cob roulette appeared for the first time.

**Conclusion**

Environmental archaeological research in the Us-hongo and Katsina Ala areas of the Middle Benue Valley, north-central Nigeria investigated palaeoenvironment, human-landscape interactions and utilisation of plant resources from prehistoric to recent times. The reconstructed palaeoenvironment of the Katsina Ala area, based on soil micromorphology and palynology, was a complex of Guinea savanna and freshwater swamps. Four cultural phases were identified in the archaeological hill site of Tse Dura rock shelter Us-hongo. In each of the phases knitted mat impressed pottery was the most dominant although several unique pottery styles emerged at successive periods. Tubers (possibly *Dioscorea* spp.) and *Pennisetum glaucum* constituted the major plants exploited. In the Valley, plants exploited were dominated by *Sorghum*
bicolor (Guinea corn), legumes and recently Mangifera indica and Citrus spp.

Acknowledgement

Special thanks go to the several Tiv families that supported us at Ushongo and Katsina Ala. The research project was funded by a Newton International Fellowship 2016-2017; additional funding was received from the McDonald Institute for Archaeological Research, University of Cambridge D M McDonald Grants and Award 2016 and 2017.

References Cited

Andah, B.W.


Blench, R.M.


Bohannan, P.

1954b. Tiv Farm and Settlement. Her Majesty’s stationery office.

Bostoen, K.
Fagg, A.

Folorunso, C.A.


Gundu, Z.A.

Ndera, J.D.

Ogundele, S.O.


Oliveira, N.V.

Ujoh, F.