

REAL-AAREA-EnvIron Workshop 29th November 2014

Department of Archaeology, University of York

Room K/159, King's Manor, York



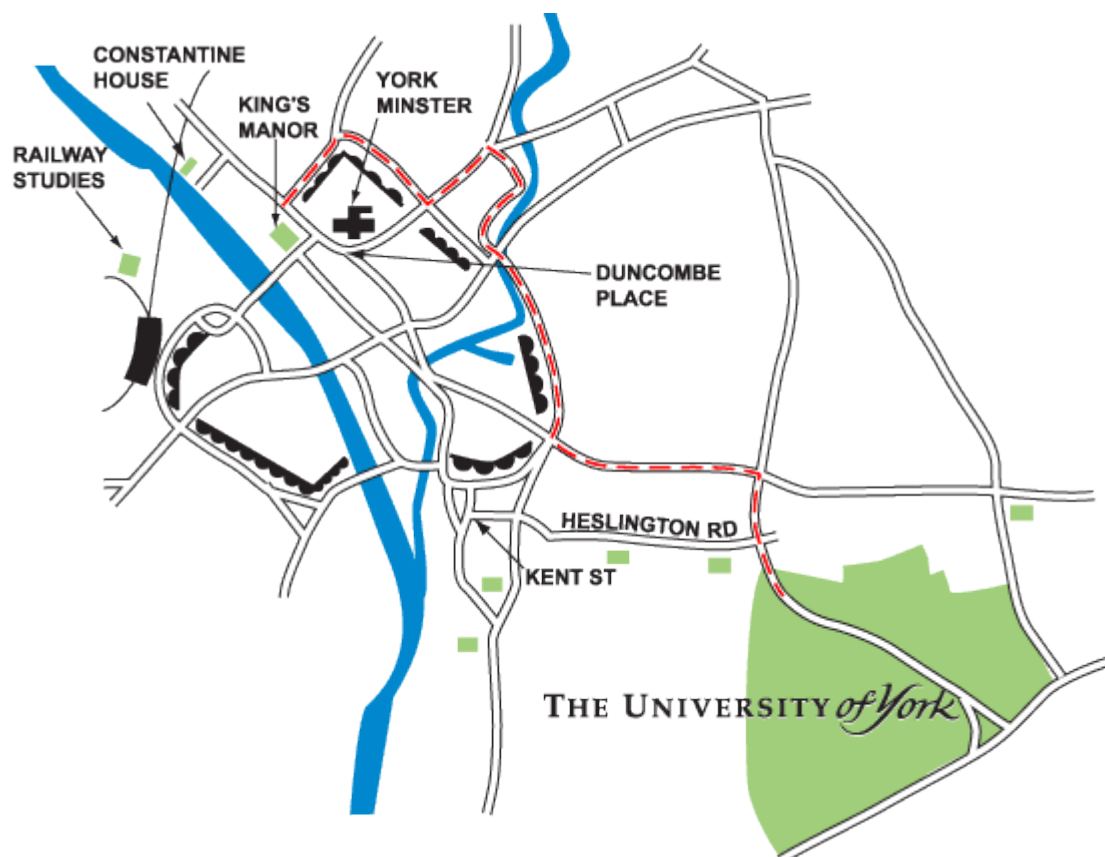
Schedule

Tea, Coffee & Buns on arrival from 9.30 am

10.00-10.15	Paul Lane	Welcome and Introductory remarks
10.15-10.35	Daryl Stump	An introduction to AAREA case-study 1: Engaruka, Tanzania
10.35-10.55	Tabitha Kabora	Preliminary results for Agent-Based Modelling at Engaruka
10.55-11.15	Senna Thornton-Barnett	Preliminary results of archaeobotanical analysis from Engaruka
11.15-11.35	Carol Lang	The role of geoarchaeological analyses in assessments of historic agricultural sustainability
11.35-12.00	Questions and Discussion	
12.00-12.25 including questions	Louise Iles	Metallurgy in the Pare Mountains, Tanzania: the 'EnvIron' project
12:25-13:00	Dr David Wright - Guest speaker and visiting researcher from Seoul National University, Korea	Lakeside View: Understanding Human Palaeogeography and Landscapes in Holocene Eastern Africa
13.00-14.00	LUNCH	

14:00-14:20	Nik Petek and Aynalem Degefa	The REALest Baringo fieldwork ever
14:20-14:40	Chris de Bont	Water network responses in a non-equilibrium environment in the Pangani basin, Tanzania: interactions between variable water availability, irrigated area, infrastructure and livelihoods
14:40-15:00	Annemiek Pas Schrijver	Landscapes of resources and rights: Samburu strategies of seasonal mobility and access
15:00-15:20	Colin Courtney Mustaphi and Geert van der Plas	New methods in palaeoenvironmental studies
15:20-15:40	Esther Githumbi, Rebecca Kariuki, Rob Marchant	Protected Areas in East Africa: Threats, Challenges and Solutions
15.40-16.00	TEA	
16.00-17.00	Roundtable discussions on resource sharing, mutual interests, and collaboration potential	

Location Map (see also attached pdf file)



ABSTRACTS

An introduction to AAREA case-study 1: Engaruka, Tanzania

Dr. Daryl Stump

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The Archaeology of Agricultural Resilience in Eastern Africa Project (AAREA) aims to assess the long-term sustainability of two east African agricultural landscapes: Engaruka in Tanzania, and Konso in Ethiopia. Aside from their inherent archaeological and historical interest, it is crucial to the proposed project that both areas have been cited within regional and global debates regarding the causes and consequences of agricultural intensification, and both feature in discussions as to whether so-called 'indigenous' agricultural techniques offer models for rural development that are more economically and environmentally sustainable than introduced alternatives. Indeed, as evidence that assessments of historic sustainability are not straightforward acts of interpretation, the 2000 hectares of irrigated fields and terraces at the now abandoned site of Engaruka have been cited as *both* an example of unsustainability (the site's desertion being seen as evidence of disastrously poor resource management) *and* as an example of resilience (on the grounds that the system seems to have persisted through two comparatively dry climatic phases during the 15th century and between the early 17th to mid-18th centuries). Through a combination of geoarchaeological, archaeobotanical and agent-based modelling techniques, the AAREA project aims to discern which of these competing hypotheses is most likely, and in so doing to assess the role archaeological data can play in sustainability assessments here and elsewhere. Acting in part as an introduction to the papers that follow, this presentation will introduce the site and summarise the excavation results from the recently completed field season.

Preliminary results of hydrological and sediment transport modelling at Engaruka, Tanzania.

Tabitha Kabora

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The AAREA project (Archaeology of Agricultural Resilience in Eastern Africa) provides a unique opportunity to assess the long term sustainability of selected historical intensive agronomies in East Africa (Engaruka, Tanzania and Konso, Ethiopia). These two historical sites feature in debates over the sustainability of indigenous agricultural intensification practices, with archaeological evidence and other data sources from both Konso and Engaruka interpreted by various authorities as proof of either the positive or negative consequences of agricultural intensification. By identifying the factors influencing the expansion of these systems as well as the effects of intensive agricultural practices on ecosystem resilience, the research will improve the analysis of the sustainability and resilience of various historical scenarios through the development of innovative assessment tools.

This paper will present the preliminary results of the project's modelling component, focussing on the hydrology of a large agricultural sediment capture terrace that was excavated and surveyed during September to October this year. This hydrological modelling can then be employed to examine the rates and volumes of alluvial sediments that were transported along now inactive water courses, thereby substantially refining our understanding of how this agricultural landscape developed, and providing a basis on which to build more complex agent-based models that include topographic, environmental and human agents of change.

Preliminary results of the archaeobotanical analysis from Engaruka, Tanzania

Senna Thornton-Barnett

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The historic terrace irrigation sites of Engaruka in Tanzania and Konso in Ethiopia, the foci of the AAREA project (Archaeology of Agricultural Resilience in Eastern Africa), have been featured in discussions of the causes and consequences of agricultural intensification as they relate to the efficacy of soil and water conservation techniques. A disagreement exists as to whether the abandoned site of Engaruka, occupied from the 14th to the 18th century AD, and the still-active site of Konso, exemplify positive or negative resource utilization. Historically it was assumed that the abandonment of Engaruka prior to European contact was evidence of unsustainability, however, research over the last decade has recast Engaruka as a potential model of agricultural resilience. Stratigraphy and pollen indicate that agronomic development was gradual rather than expediently extractive and that the palaeoenvironment was much wetter than the present day, at least during some of the site's period of occupation. Furthermore, on the basis of previous work Engaruka appeared to be an isolated example of reliance on a single cultivar: sorghum. Presented here are the preliminary archaeobotanical results of the recent fieldwork at Engaruka which are already able to demonstrate that cereals other than sorghum were also grown. Sample analysis is ongoing, but these early results demonstrate the value of systematic sampling of for macrobotanic remains, and when used in combination with modern vegetation surveys can be employed to assess how the inhabitants of Engaruka adapted to environmental change without apparently fundamentally changing their way of life.

The role of geoarchaeological analyses in assessments of historic agricultural sustainability

Dr. Carol Lang

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Soil sediment properties can provide evidence that reflects the environment in which they have been formed; therefore, recovery of known anthropogenically modified sediments from an archaeological context has the potential to assist in understanding complex site formation processes that relate to pasted land utilisation and agricultural activity.

Geoarchaeology, the combined disciplines of archaeology and geomorphology, measures soil/sediments through quantitative and qualitative macro-analyses of deposition processes, physio-chemical changes and pedogenesis of archaeological sites. These investigation methods provide a bridge between the macro- and micro-sequences of environmental and anthropogenic in-put that may indicate major influences on landscape change, and hence the subsequent sustainability of historical agricultural systems.

Analysis of soil/sediments is undertaken through macro- and micromorphological investigation of physical, chemical and biological soil quality indicators. These investigation methods are preliminarily conducted in the field through fundamental geomorphological and soil/sediment assessments and the sampling of the archaeological context. Laboratory based examination is then applied to the soil/sediments through soil macro- and micromorphology and inorganic chemical composition to determine the endurance of the historic agricultural system.

This presentation will focus on the utilisation of geoarchaeological techniques in assessing the sustainability of historical agriculture.

Metallurgy in the Pare Mountains, Tanzania: the 'Environ' project

Dr Louise Iles

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The pre-colonial economy of the Pare Mountains is known to have had a significant emphasis on the production of iron. Rich in magnetite ore-sands and high quality clays, Pare was a major regional source of iron, supporting agricultural populations living in neighbouring highland ranges that lacked iron resources. Recent survey in Pare has provided material evidence for this large-scale iron production industry in the form of accumulations of slag blocks, substantial piles of discarded tuyères and preserved furnace remains. Several of these sites, dating from the late-1st to late-2nd millennium AD, have now been excavated. As well as ore and clay, iron production also requires a supply of charcoal for fuel, and is therefore often seen as a factor in forest degradation. Indeed, iron production has been implicated in local changes in slope stability and subsequent phases of soil erosion in Pare over the past c. 1500 years. This research seeks to examine whether – and if so, to what extent – Pare's iron production did in fact contribute to these environmental processes. Archaeometallurgical analyses of excavated waste products of smelting events (slag, tuyère, furnace lining) plus modern samples of local ores and charcoals, are being used to reconstruct the inputs and outputs of the smelting technologies in question, and inform estimates of the fuel requirements that this industry demanded.

Keynote Paper

Lakeside View: Understanding Human Palaeogeography and Landscapes in Holocene Eastern Africa

Dr. David Wright

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This talk focuses on reconstructed lake levels from Lake Turkana, and deciphers what it infers about prehistoric moisture regimes throughout the Holocene across the region. By reconstructing the hydrological history of closed lake systems, identifying climatic drivers is possible. We will explore how humans seem to have responded to the rather erratic position of the Intertropical Convergence Zone and Congo Air Boundary during the African Humid Period and during its protracted termination phase in contrast to what came afterward. Although humans respond non-linearly to climate, cultural patterns of movement and subsistence are better contextualized within robust paleoclimatic models afforded by high-resolution datasets.

LUNCH

The REALest Baringo fieldwork ever

Nik Petek and Aynalem Degefa

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This paper will present two PhD researches currently taking place around Lake Baringo. The first project is archaeological, focusing on the effect of human occupation on the vegetation and landscape in the past centuries as is visible through archaeological remains, vegetation patterns, and sediment analysis. Attention will be given to the various aspects of the work done so far, which includes survey fieldwork and the recording of abandoned bomas (homesteads) using GIS and aerial and satellite imagery, and the recording of vegetation within those bomas. Some of the more interesting finds and observations from the fieldwork will be presented, as well as the future direction of the PhD will be discussed.

The second PhD project is on reconstructing long term soil erosion and lake sedimentation as a result of human landscape interaction around Lake Baringo. Preliminary results of the exploratory geochemical study undertaken on sediment cores showed pronounced spikes of recurrent soil erosion and lake sedimentation around mid-20th century. For better understanding of sediment mobilization from the different sub catchments in the lake basin, the lake bottom was cored at 37 locations. The lake sediment and soil samples will be geochemically analysed with some preliminary results to be presented. This presentations will hopefully lead to a discussion with the audience on how to better enhance the research and its methodology

Landscapes of resources and rights: Samburu strategies of seasonal mobility and access

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Research in central-northern Kenya will be carried out to investigate the creation of mobility pathways on a landscape characterized by a mosaic of large-scale rangelands, conservancies, public conservation areas, and smallholder farms. This study will try to identify and frame to a deeper extent the access mechanisms of gaining, maintaining and controlling access to pasture for both the pastoralists and the landowners within a the specific socio-political and economic environment, and to find out about the mechanisms of exclusion and inclusion to such arrangements. The first aim is to investigate the socio-ecological and political factors that determine the pastoralists' decisions to take a certain route on the landscape toward dry season grazing areas. Social networks, water points, borders and occurrence of diseases are taken into account for shaping such pathways. The second research focus is on the strategies used and social arrangements that are created between those that control access to water and pasture with those that want to make use of it. Additionally, emphasis will be placed to processes of inclusion and exclusion both within and between the pastoral communities. Encounters, cooperative or conflictive, are objects of investigation, as well as the meanings given to such encounters and strategies of mobility and access. Finally, the role of policy will be investigated to explore to what extent policy openings add to pastoral mobility, or not.

New methods in palaeoenvironmental studies

Dr. Colin Courtney Mustaphi and Geert van der Plas

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This talk will summarise useful emerging methods for investigating past environments, ecological processes and human-environment interactions at local to regional scales. Main foci will be on biomass burning trends, vegetation changes, crop introductions by humans, and land use activities. How these techniques can be combined with palaeoenvironmental, archaeological, anthropological, and remote sensing approaches to answer new and illuminating research questions will be discussed. Developing a regional network of high-resolution pollen data and historical records to constrain the spreading of maize through East Africa Agricultural practices have a large impact on the landscape. Maize has become an important and widespread food crop since the 20th century, but little is known of its spread across East Africa since its historically documented introduction at the end of the 16th century. To document the introduction and spread of maize through East Africa with higher spatial and temporal resolution, high-resolution pollen data from across the region will be correlated with historical records. Sediment cores from different lakes in Kenya, Tanzania, and Uganda will be analyzed for fossil pollen content, focusing on the large grass pollen uniquely attributed to maize. Lead-210 and/or Cesium-137 dating is required to date the regional first appearance of maize with appropriate precision. Where available, historical agricultural records are used to quantify the time difference between the documented start of maize cultivation and its first appearance in a local pollen record.

Protected Areas in East Africa: Threats, Challenges and Solutions

Rebecca Kariuki, Esther Githumbi and Rob Marchant

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Protected or conservation areas are locations with high natural, ecological and cultural values. Protected areas in East Africa range from forests, wetlands, savannahs, marine, arid and semi-arid zones. They cover 26%, 28% and 8% of land cover in Uganda, Tanzania and Kenya respectively. The level of protection accorded per area depends on the enabling laws of each country and the regulations of the international organisations involved. Protected areas provide habitat and protection to threatened and endangered species. Additionally, through wildlife resources, they offer benefits and opportunities for local and national economic development through improved livelihoods and provision of environmental goods and services such as watershed protection and carbon sequestration. With the increasing demand on natural resources, the threats facing protected areas, including human encroachment, wildlife poaching, habitat degradation and loss of wildlife migration and dispersal areas are increasing. Initially, conservation in East Africa aimed at separating societies from perceived pristine/natural environments. Existing and historical land use policies and protected area network were founded at a time of entirely atypical environment-society relationships. However, with time local communities got an opportunity to take part in conservation through community ranches and sanctuaries. Additionally, the mandate behind protected areas has evolved from trophy hunting, total exclusion, biodiversity conservation, to ecosystem services and inter-relationships with surrounding human populations. Hence the need of including societies in management of protected areas. For example most of south-east Kenya where Amboseli, Tsavo, Maasai Mara, Chyulu are located a series of group ranches, sanctuaries and wildlife corridors where the local communities have land ownership benefits within the group ranches and those who own land around have been incorporated.