MARIE CURIE ACTIONS
Marie Curie Excellence Grants (EXT)

Historical **E**cology of **E**ast **A**frican **L**andscapes

"HEEAL"

Abstract: This four year project aims to investigate the long-term historical ecology of East African landscapes over the last c. 500 years. This period coincides with the main era of direct European engagement with the region, the spread of post-medieval European values, and the emergence of independent states. It also witnessed a number of radical transformations of pre-colonial African societies and landscapes driven by a combination of natural and anthropogenic factors. These developments had profound consequences for contemporary environmental conservation and land-use issues, but many information gaps and research questions remain as to the relative contributions of different factors in shaping today's landscapes. Current scholarly opinion is thus divided over the whether climate change, African land use, the incorporation of the region into the North Atlantic and Indian Ocean world systems, European colonial policies, or other factors were the main driving force. The proposed project seeks to address these lacunae through a unique and highly innovative programme of archaeological research supported by bioarchaeological, historical and palaeoecological studies linked to the testing and refinement of current ecological theories of resilience and socio-cultural ideas about dwelling and the landscape, so as to develop more appropriate conservation and land management policies for sub-Saharan Africa.

B1.1 SCIENTIFIC QUALITY OF THE PROJECT

B 1.1. Importance and relevance of the research topic

The EU currently spends €10.8 billion a year on Africa, much of which is directed to programmes aimed at poverty reduction while also simultaneously endeavouring to ensure environmental sustainability and the long-term conservation of biodiversity and cultural resources. Concurrent with this, other donor agencies and charitable foundations invest large sums in programmes aimed specifically at the protection of Africa's landscapes and wildlife. Such strategies are not new, however, and various European countries have a long history of engagement with African environments and their management, in many cases predating the main era of European colonialism. Recent scholarly studies from a variety of disciplinary perspectives have shown that, however well-intentioned, such efforts have frequently failed (and in several cases made the situation worse), because of a series of misunderstandings about the nature of African environments and human-environment interactions. There is now general scholarly consensus that **in order to plan for the future it is essential to understand the past**. Moreover, despite the steady increase in European research on African environments and their combined human and natural histories, **many crucial knowledge gaps remain because of inadequate funding of relevant research and insufficient capacity in African countries**. It is also widely acknowledged that in light of the escalating rate of global climate change, **environmental problems, and human responses to these, are likely to become more acute across the African continent**. As the world's largest donor of development aid to Africa, it is crucial that European researchers from across the disciplines work toward filling these knowledge gaps while simultaneously helping to build research capacity within Africa. This sentiment is directly

in keeping with various policy statements by the EU, and has been re-emphasised in the recently launched **EU Strategy for Africa**. The creation of the ***H**istorical **E**cologies of **E**ast African **L**andscapes* (HEEAL) research group at the University of York aims to provide precisely the type of cross-disciplinary centre of excellence needed to fill these knowledge gaps about past environmental conditions in East Africa and the complex history of the interplay between human activities, climate change and ecological processes. By working in tandem with several other Marie Curie funded activities at York (see B2.1), most notably the *Yor**k** **I**nstitute for **T**ropical **E**cosystem Dynamics* (KITE), **HEEAL will generate new understanding of the historical consequences of Europe's engagement with East Africa** over the last five hundred years, how this altered local environments and systems of environment management, and the implications for current and future policies toward poverty reduction and landscape management in the region.

More specifically, **HEEAL aims to**:

1) Reconstruct the changing cultural, economic and environmental landscapes of areas of Eastern Africa in the period of European expansion from c. 500 years ago;
2) Determine the relative effects of agricultural intensification, pastoralism, iron smelting and international trade on human societies, wildlife populations and vegetation patterns over this period;
3) Develop and test appropriate models of landscape change and continuity based on the principles of historical ecology, world-systems theory and notions of ecological resilience;
4) Produce results to inform strategies of cultural resources and landscape management and conservation policy in the region and more generically.

Research Background: Eastern Africa is a mosaic of diverse landscapes and habitats, each of which is associated with an array of different values and perceptions by different users and observers. These categories of value can range from various 'natural' indexes such as biodiversity, vegetation type, soil quality, or agro-ecological zones (e.g. Pratt & Gwynn 1977; Emerton 1996; McClanahan & Young 1996), through different assessments of economic value and/or agro-pastoral potential (e.g. Voortman *et al.* 2003; World Bank 2003) and notions of common property rights (e.g. McCay & Acheson 1987; Hanna *et al.* 1996), to ideas concerning the cultural, historical or sacred significance of these landscapes to local, regional and international constituencies (e.g. Cohen & Atieno Odhiambo 1989; Shipton & Goheen 1992; Wagner 1996; Luig & von Oppen 1997). Twentieth-century polices directed toward the management, protection, enhancement and/or restoration of East Africa's landscapes and their associated habitats were driven by a restricted set of 'environmental narratives' (*pace* Roe 1991). First, there was a tendency to regard indigenous agriculture, pastoralism and hunting as wasteful practices and the associated land management regimes as having, over time, led to overall environmental degradation that continues to this day. Second, that surviving areas of high biodiversity and/or dense concentrations of wildlife were believed to represent the remnants of 'pristine' environments barely touched by human activities and from which humans had to be excluded if their long-term survival was to be ensured. And finally, that throughout the pre-colonial era East Africa's populations comprised a series of bounded social groups with fixed ethnic identities, whose spatial distributions were constantly changing as a consequence of recurrent population migration. In contrast, more recent studies conducted from the perspective of historical and political ecology both within the region (e.g. Maddox *et al.* 1996; Steinhart 2000; Anderson 2002; Mackenzie 2003; Håkansson 2004; Widgren & Sutton 2004) and elsewhere (e.g. Denevan 1992; Foster 1992; Fairhead & Leach 1996; Head 2000; Kirch 2005) have highlighted the complex and contextually specific interplay between natural and anthropogenic forces in the shaping of landscapes, and the values attributed to them by different interest groups and communities. It is also now widely recognised that the earlier narratives and policies of environmental conservation, far from being 'value free', frequently served the interests of the colonial state and European settler communities (Mackenzie 1990; Neumann 1998; Beinart 2000). Parallel studies have indicated that the fluid nature of many ethnic identities in the past facilitated population movement, particularly during periods of

environmental stress, but that this coping system broke down following the colonial creation of 'tribal' boundaries (e.g. Feierman 1974; Willis 1992).

These developments have in turn encouraged a shift in management strategies toward protected areas (Brockington 2002; Mulholland & Eagles 2002; Gillson & Willis 2004; Lovett *et al.* 2005), with new emphasis being placed on the importance of community-based conservation, pro-poor tourism and the significance of indigenous knowledge systems (e.g. Murphree 1993; Reij *et al.* 1996; Berkes 1999; Bolig & Schulte 1999), as well as on the need to link biodiversity conservation more overtly with poverty reduction (Adams *et al.* 2004). Fundamental though such shifts in thinking have been, many questions still remain, not only as to what community-based conservation entails in reality or whether it achieves its conservation goals (e.g. Gibson & Marks 1995; Newmark & Hough 2000; Barrow & Fabricus 2002; Logan & Mosely 2002), but also how the landscape aesthetics of local populations and the cultural and historical values they attach to such places diverge from those that continue to be imposed by national governments and international conservation bodies. Moreover, while it is undeniable that human impacts on the environment have intensified over the last few centuries, as have certain natural processes, it is often difficult to assess claims about the current 'health' of a particular ecosystem, its relative 'resilience', evidence for 'degradation' or, more generally, its 'quality', since the relevant observational data on which such statements are based are either lacking, insufficiently detailed, or of insufficient time depth to allow accurate assessment.

It is these knowledge gaps that the proposed project is intended to address by **integrating** recent **historical syntheses** and **palaeoecological** data with the results of focused **archaeological** and **bioarchaeological** studies of the changing histories of land use, subsistence strategies, natural resources extraction, trade and exchange, dietary practices and patterns of disease. The geographical focus of the research will be on two areas of East Africa, selected because of the quality and range of available sources, archaeological potential, and importance for contemporary landscape and biodiversity conservation, that over time also became increasingly linked. The temporal focus will be on the **last five hundred years**, with particular emphasis on the 18th to early-20th centuries, coinciding with the inception and intensification of direct European contacts with the region and subsequent colonisation, and integration with the industrialising world and the North Atlantic world-system. The project benefits from a strong multidisciplinary approach since by combining for the *first time* archaeological and historical data with ecological models and information, **the project will be able to demonstrate how human activities have helped to create and not just degrade these landscapes**.

B1.2 Research topic / Quality of the research

The key research questions to be addressed under the project are as follows:

1) What was the nature of land use, subsistence and settlement prior to the expansion of European demands for African commodities in the late 18th century?
2) How were these elements and local ecological conditions transformed following the expansion of this trade and its subsequent decline in the 20th century with the establishment of colonial rule?
3) How did these developments affect dietary practices, patterns of morbidity & disease, and what influence did climate change have on these?
4) How were local perceptions of landscape and the environment shaped by these developments and in what ways do they diverge from comparable European values?

Study area: The project will focus on two broad research areas in Eastern Africa, selected for the richness of the source materials available, the diversity of habitats and ecosystem functioning, and the potential synergies they offer for developing multi-disciplinary and comparative approaches to their study. These areas, which encompass coastal, semi-arid, montane, lacustrine and riverine environments are as follows: Tanzania – the Usambara and Pare Mountains, Maasai Steppe and the Pangani Basin; & Kenya – Samburu, Laikipia Plateau and the Northern Rift.

Current state of knowledge: The later pre-colonial history of both study areas has been the subject of considerable research in recent years, with much of this work focusing on the changing relations between local ecologies and cultures (e.g. Glassman 1995; Kjekshus 1996; Maddox *et al.* 1996), the environmental and economic consequences of the caravan trade and elephant hunting (e.g. Sheriff 1987; Koponen 1988; Steinhart 2000; Håkansson 2004), and patterns of warfare, famine and disease (e.g. Lonsdale 1992; Giblin 1992). There has also been parallel research on the environmental consequences of various colonial policies toward resources, land-use and environmental management (e.g. Koponen 1994; Spear 1997; MacKenzie 1998; Anderson 2002), and on the histories of pastoralist expansion from c. 1700 (e.g. Spear & Waller 1993; Spencer 1998). Concurrent with much of this historical research, there has been an intensification of palaeoecological and climate change research across the region, providing for the first time detailed overviews at sufficiently fine temporal resolution to make inferences concerning the operation of natural climatic cyles (e.g. Karién *et al.* 1999; Cole *et al.* 2000; Verschuren *et al.* 2000; Hastenrath 2001; Lamb *et al.* 2003; Stager *et al.* 2003; Ashley *et al.* 2004; Taylor *et al.* 2005). Despite the high quality and detail of this research, it remains difficult to resolve current debates over the relative contributions of African land-use strategies, long-distance exchange, incorporation into the North Atlantic world system, colonial policies of environmental control and plantation economies, and natural climatic cycles. These problems are compounded by the fact that the majority of sampling sites are located away from areas of human settlement and activity, thus making it difficult to relate observed changes in habitats directly to human patterns of resource use. Also, while the historical studies have tapped the extensive body of archival sources and local oral histories, the level of detail and specific relevance of the available information becomes far less reliable before c. 1850 AD. It is here that a programme of **historical landscape archaeology** (see Funari *et al.* 1999; Kusimba 2004; Reid & Lane 2004) linked with bioarchaeological investigations has the potential to provide the necessary data on issues such as settlement patterns, subsistence strategies, diets, patterns of diseases, sources of raw materials and traded commodities, and localised impacts on the environment.

Theoretical perspective: The overall integrative architecture or meta-language for the project will be that of **historical ecology**, with archaeology as the lead discipline. The term has been adopted by many researchers across the spectrum of Earth sciences, social sciences and humanities (e.g. Crumley 1994; Balée 1998; Swetnam *et al.* 1999; Johnson *et al.* 2005), and offers both conceptual and practical tools for joining very different kinds of information into an assessment of human-environment interaction. Focusing on the unique characteristics of place, historical ecologists gather contemporary and antecedent environmental and cultural evidence so as to identify key variables and their relationships to one another, in a manner that explicitly includes human agency, memory, dwelling and landscape aesthetics (e.g. Cosgrove 1984; Baker & Biger 1992; Hirsch & O'Hanlon 1995; Schama 1995; Ashmore & Knapp 1999; Ingold 2000), while allowing assessment of how current practices and circumstances are likely to be impacted by change. The concept is thus well suited to examine the triad 'landscape', 'culture' and 'ecology' that form the core themes of this proposal. Drawing on examples of good practice developed in other parts of the world, and most notably recent studies of the evolution of European landscapes and reconstructions of their long-term historical ecology that have drawn extensively on **archaeological sources** (e.g. Crumley and Marquardt 1987; Van Andel *et al.* 1990; Butzer 1996, 2005; Van der Leeuw 2000) **HEEAL seeks to demonstrate how the insights that can be gained from such integrated multi-disciplinary research can be used to develop more effective, equitable and culturally appropriate landscape management strategies, with specific reference to Eastern Africa**.

Methods: The archaeological components of the project will encompass large-scale foot surveys and associated surface collections to locate and date sites, with targeted area excavations at selected locations to collect viable faunal, botanical, geoarchaeological and artefactual samples for detailed analysis and dating, coupled with documentary, archival and oral history research. These data will be linked to the results obtained from a suite of archaeozoological, bioarchaeological, and

palaeoecological studies conducted for addressing specific questions concerning habitat distribution, climatic conditions, seasonality of subsistence practices, human diets and wildlife ranges, as follows:

Archaeozoology: This will involve identification of species & age and sex proportions, taphonomic analysis and interpretation of faunal remains for evidence of exploitation of wild fauna and/or animal husbandry and species distributions. Faunal samples will also be studied to provide evidence of herd management and/or hunting strategies, diet, local environments, and the effects of disease and/or drought.

Bioarchaeological studies: These will focus on the use of analyses of variations in various stable isotope ratios (δ13C, δ15N, $^{18}O/\ ^{16}O$ and $^{87}Sr/\ ^{86}Sr$) preserved in buried soils, animal remains (bone collagen, teeth, ivory), human remains, organic matter such as charcoal, and bulk carbonates to detect climatic influences on vegetation, as well as dietary choices, crop introductions, patterns of migration and the movements between habitats of different keystone species (such as elephant) at different times and in different parts of the study region.

Palaeoecological Analyses : In order to investigate long-term vegetation dynamics and processes of degradation, sediment cores are required which will yield palaeoecological and geochemical data. Comparison of palynological records from close to different archaeological sites and areas of human activity will provide insights into the spatial as well as the temporal scale of vegetation change, providing an opportunity to distinguish between climatically induced vegetation shifts at the regional scale and patch-scale changes in vegetation induced by local disturbances. Combined with Pb-210 and radiocarbon dating, these data will yield a detailed chronology of changes in vegetation and provide an understanding of vegetation dynamics. From excavations, pollen, phyotliths, fungal spores and charcoal fragments will be analysed to show relative changes in the abundance of plant species, and the use of local plant resources for cooking, building and metal production.

Ecological modelling: This aspect of the project will analyse the palaeoenvironmental, historical and archeological data (e.g. evidence from faunal remains, sediments and pollen concerning habitat types & distribution, and the relative abundance of different species) from different sites and strata of different dates so as to reconstruct patterns of habitat use and alteration by humans at different times in the past, and to model the possible effects of these on species shifts and community composition. The results will then be discussed in relation to ideas concerning shifting base-lines as recently addressed in ecological theory (e.g. Pauly 1995; Amorosi *et al.* 1996; Guo 2003; Mooney *et al.* 2004; Willis *et al.* 2005). The basic thesis to be examined is the idea that habitat alterations might have occurred long before the implementation of modern scientific monitoring, such that actual perceptions of current ecological base-lines (e.g. structure and function of the ecosystem at present, "health" of the system, etc.) might not accurately reflect its history (cf. Foster & Motzkin 2003).

B1.3 Potential for promoting innovation: The proposal is the **first of its kind in Eastern Africa**, and is warranted by changes in the intellectual, ethical, and political context of studying Africa's past, and by current developments in archaeological theory and methods, cultural heritage management, history, and ecology. The proposal is intended to create **an innovative, comprehensive programme of research on the long-term ecology of African landscapes** that will provide the **benchmark for future studies** and **set standards of good practice**. It is hypothesised that insights gained from this study will shed **new light on modern concerns about consumption, sustainability and ecological change** and on the appropriate ways, both technological and social, with which to deal with them. Moreover, given the relative paucity of archaeological research conducted in the two study areas this project will prove both **original and highly informative to wider aspects of later East African archaeology and pre-colonial history**. Also, because of the many ecological, cultural and historical similarities between this area and other parts of Africa south of the Sahara, the data and

analysis generated by the study will also **contribute to understanding Africa's complex environmental history,** the value of taking a 'long-view' of apparent problems when formulating environmental and land management policy and **provide a better understanding of how local communities perceive environmental 'risks' to their livelihood** (Quinn *et al.* 2003). The project will produce **a unique data set of historical, ecological and environmental materials** suitable for testing and refining the applicability of current theories of ecological resilience and world systems analysis from the perspective of differing scales of spatial and temporal resolution, thereby **providing the much-needed knowledge to guide EU policy and allocations of funding to Africa's development, and which is unavailable at present.**

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