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PARTIE A. Caractéristiques générales

Titre du projet:

Ecological changes in Rock Art and watering sites of the pastoral landscapes (Chalbi desert, Kenya).

Acronyme : 3P-ART-WAT

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PARTIE B. Programme scientifique

Résumé / Summary :

Over the last 20 years, current political and economical changes in northern Kenya have driven international institution, government and investor development in these arid regions to invest on building infrastructure to extract new energy sources (oil, wind, hydroelectric) to the exclusion of pastoralist rangelands and water points. This exclusion led an increasing inter-community violence and security in pastoral landscapes where water places and rangelands have for long strongly be connected with security and identity and heritage. For many reasons, water places and rangelands are becoming a key spot in arid lands to understand the current socio-ecological changes as well as to retell the past ecologies of the Chalbi desert.

Through an international collaborative research based on mobility, 3P-ART-WAT aims to understand temporal and spatial dynamics of human-landscapes interactions by focusing on the past and present changes of socio-ecological niches (oases, water points, rivers, arable land, etc.). From a set of watering places connecting important cultural, archaeological and ecological features, the project brings together French and Kenyan researchers from diverse disciplines (anthropologists, soil scientist, ecology and archaeology), pastoralist organisations and local stakeholders. As such they represent biocultural markers The present research proposal highlight the socio-ecological dynamics of a pastoral landscape from recently documented watering places and new archaeological evidences. Unknown to scientific communities, most of these sites tends to show that most "rock art" sites are correlated with other archaeological artefacts (tombs, cairns), but also with specific ecological gradients. 3P-ART-WAT aimed at describing the environmental complexity and changing landscapes into which these sites fit. By collecting anthropological (oral history), ecological (soil and vegetation) and ethno-historical data, we expect to highlight the socio-ecological dynamics of these sites, and therefore to

rework the history of pastoral organizations from of their ecological materialities since 1800. 3P-ART-WAT examine how local societies (social and political organization) and ecological systems have from the past to present responded to the variability of climatic condition.

Programme scientifique / Scientifique programme:

Description, objectives and methodology.

3P-ART-WAT is a collaborative and interdisciplinary research project on the East african socio-ecological changes in arid land. The research project studies the capacity of pastoral and agricultural societies to maintain themselves in situations of ecological transition, characterized by new modes of administration of nature (for example, conservancies) and by large investments related to megaprojects (LAPSSET project, etc.).

In many Arid and Semi-Arid Lands, ecosystem services are often correlated with natural resources on which the livelihoods of the inhabitants depend. The greater ecosystem of the Chalbi desert (Marsabit County, Northern Kenya), comprise various natural protected areas endowed with immense biological diversity and water which support vital ecosystem services and the existing social and political organizations. Most of the inhabitants are dependent on the available resources to sustain their livelihood and have developed pastoralism (a system of animal production in which mobility allows an efficient use of scarce resources available). Over the last 20 years, Northern Kenya has experienced a shift from the implementation of various models for protection of natural resources in order to conserve biodiversity and scarce resources (water, soil, pasture, forest) to the merging of large scales investments and megaprojects. The Chalbi anthropo-ecosystem faces many factors of stress linked with natural resources policies, environmental dynamics and geopolitical context. Due to poor soil and to the scarcity of water and vegetation, the historical and adaptative pastoral livelihood of this arid land is on the move. It is threatened by climate variability and the proliferation of conservation projects as long as conservation models tend to inhibit some vital functionality of the areas protected such as the socio-cultural values and practices (transhumance roads, place for trade, land uses...) of pastoralists' livelihood. At the same time, current political and economic changes in northern Kenya have driven international institution, government and investor development to invest in global water reform and on building infrastructure to extract new energy sources (oil, wind, hydroelectric) to the exclusion of pastoralist rangelands and water points. On one side, the socio-technical choices implemented to anticipate climatic events such as severe drought, or more recently, flooding, have informed renewed pastoralists ecologies of the main group (Rendille, Gabra and Boran) and, subsequently, transformed livestock practices and pastoralists strategies as we shown in a published paper of *Cahiers de l'Afrique de l'Est* (n°50, 2015) : diverse conservation models interact with Gabra ecologies in that sense that conservation processes contribute to the merging of competitive vision of nature and the erosion of « their environmental consciousness », or knowledge, and *in fine* to the conservation of some specific ecological niches (oases, watering places, rivers, arable land, « sacred sites », etc.). On the other hand, large scale investments and megaproject (LAPSET, Wind farm, etc.) reshape land uses of these marginal lands, defined as land of little value and useless for human purposes, that pastoralism, as a production system adapted to arid zones, had highlighted. The East African “development turn”, from a vision of based on the conservation of natural resources for touristic concerns to a vision focusing on “megaprojects”, provides an exemplary case for studying a transition period and documenting it in a territorialized perspective. This situation leads to the development of intercommunal violence and demands that development policy decisions respect the cultural rights and livelihoods of local communities.

In this context, 3P-ART-WAT aims to understand temporal and spatial dynamics of human-landscapes interactions by focusing on the past and present socio-ecological changes of ecological niches (oases, water points, rivers, arable land, etc.). From a set of watering places in northern Kenya connecting important cultural, archaeological and ecological features, the project brings together french and kenyan researchers from diverse disciplines (anthropologists, soil scientist, ecology and archaeology), pastoralist organisations and local stakeholders with diverse knowledge, skills, and experience to exchange understandings of pastoralist self-organisation and sustainable development in arid landscapes of northern Kenya. The present research proposal aims to highlight the past socio-ecological dynamics of a pastoral landscape from recently documented watering places and new archaeological evidences. From these sites, 3P-ART-WAT examine how local societies (social and political organization) and ecological systems have from the past to present responded to the variability of climatic condition.

Background

The present research proposal is based on an ethnographical research on the resilience of Gabra pastoralists to severe drought (*Pastoral livelihood, wash and natural ressource managment in Northern Marsabit*, IFRA, DFID, 2012, 92 p. see : <https://halshs.archives-ouvertes.fr/halshs-01790835/document>). Within the framework of human and political ecology, this research was questioning how *Disaster Risk Reduction programs*, including “conservation models” (conservancies) and "growing water" technologies (modernization of wells systems) under climate change contributed to new perceptions, adaptations and competing visions of natural resources such as water and the rangeland.

Initially, this research was on the forms of mobility seen as the result of interactions between environmental dynamics, public policies and societies. Aiming to understand the links between pastoralism and the natural resources of arid zones, they were the subject of a documentary on water-conflicts in the “singing wells” of Marsabit county (CNRS). This work also gave rise to a report entitled *Pastoral livelihood, wash and natural resource management in Northern Marsabit* (2012). A database on the evolution of the lifestyles of the nomadic populations of northern Kenya, commonly associated with the Camel complex, in a context of environmental changes, has been created. It contains an exhaustive inventory of “watering sites”, pastoral use and historical and ecological data associated with them.

This preliminary work formed the melting pot of scientific partnerships with the Kenyans (Kenyatta University; National Museum of Kenya), the French Institutes in Africa Nairobi (IFRA, IRD), around a collaboration on the conservation practices of Gabra herders and their consequences on the environmental dynamics of the endorheic basin of Chalbi. These research shaped an interdisciplinary and collaborative research project on *conservation, land scarcity and changes in pastoral livelihood* between the Institut Interdisciplinaire d'anthropologie du contemporain, the Institut Français de recherche en Afrique (Nairobi) and Kenyan researchers from Kenyatta University and the National Museum of Kenya. Under the NAPAST project (“*Natural protected areas and dynamics of Pastoralist heritage*”) funded by the PPR PAREGO (2012, IRD), networking activities started to describe different models of conservation and management of natural resources that exist within the greater Marsabit ecosystem, ranging from the conservation models employed for large conservation sites to those implemented on smaller scale-fenced parcels. The study of relationships between land uses and natural protected areas formed the entry point of a workshop (“zone atelier”) held in Nairobi.

It sets an approach able to overpass disciplinary assumptions and to create a common ground for discussion in a context where the hegemonic discourse alleged that the maintenance of ecological functions of the Chalbi ecosystem is built on an antagonism between the predatory activities of pastoralist societies and conservation practices. In this dual discourse the viability of the Marsabit ecosystems was based on the one hand on the adaptability of communities to changes, and on the other hand, sustainability of protected areas was related to their ability to retain and provide

ecosystem services over the long term. This antagonism formed the horizon of current research on biodiversity, sustainable development and natural resource governance. In this context, interdisciplinary approaches networking activities shed light on the description of the multi socio-ecological functions of protected areas, i-e on the multiple interaction and connectivity between protected areas, anthropo-ecosystem and greater ecosystem. This situation prompts for suggestions to address the interfaces between ecosystems and societies and to better integrate thoughts centered on the sustainability of anthropo-ecosystems, rather than the split between "environmental conservation" and "development".

In addition, this research gave rise to the submission of a project entitled *Protected Natural Areas and Transition of Pastoral Economies* (NATEP) (PPR Parego, IRD, October 2013), involving two archaeologists (E. Ndiema, National Museum of Kenya & Jack Harris, Rutgers University), an ecologist (P. Maundu, National Museum of Kenya) and a soil scientist (Michel Brossard, IRD Montpellier). In a context where the establishment of protected areas is most often the result of external interventions (environmentalist lobby, NGO, etc.), NATEP was identifying, in a more systematic way, "socio-natural" sites attesting to the capacity of local societies to maintain their environment.

Secondly, this perspective led us to develop our research on conservation practices of watering sites in the Chalbi Desert. Based on data collected in 2013, we were able to identify the existence of a strong relationship between sites subject to conservation practices, ecological niches, and archaeological sites presenting rock art for most of them, and whose characteristics seem to be linked to the nexus "water, energy, food". Two missions carried out in August 2013 and January 2015 made it possible to carry out an exhaustive inventory of socio-natural sites on the eastern slope of the Chalbi desert, and to update an old "oasis system" which includes a dozen sites. Combining ethnographic research and collection of cartographic data, this mission enabled the collection of data necessary for the production of a set of maps from which we can describe the role played by "well systems", "oases" and water points in the social and political organization of the Rendille and Gabra territories, and more generally in the making of pastoral landscapes of the past. Invested both by wildlife and by humans who have made them "places of water" (places of production and exchange of salt and coconuts and exploitation of plant cover), these niches open a new perspective both on the history of the oases and on the "landscape" dynamics of the Chalbi ecosystem. In this perspective, the study of "watering sites" is seen both as revealing the bio-cultural boundaries of the Gabra and as a possible marker from which to study the socio-ecological changes of the past. (Cf poster entitled Biodiversity conservation and water security in pastoral landscapes of the Chalbi desert ("Biodiversity and Food Security - From Trade-offs to Synergies", 3rd International Conference on Biodiversity and the UN Millennium Development Goals - October 29-31, 2014, Aix-en-Provence, France, 2014, see: <https://halshs.archives-ouvertes.fr/halshs-01099476/document>

Current research proposal

Based on the mapping of Gabra water places, 3P-ART-WAT sets out to describe how water has shaped the borders of the Gabra / Rendille / Dasanech territories as well as their bio-cultural frontiers. We suggest that "watering places" provide an anchorage for understanding how societies of the past have adapted to the socio-ecological changes of the present, and in particular to the period of aridification which seems to start around 1800. Although many pastoral communities are in a situation of transition (agro-pastoralism, sedentary agriculture, wage labor and trade, as a response to the recent decimation of pastoral herds by drought), the same "watering sites" remain important in the delimitation of the territories of northern Kenya, their borders and their landscapes. A first mission "*Understanding the environmental complexity of rockart site in Chalbi desert*" (Franco-Japanese mission, October 9 to October 31, 2016), initiated within the framework of a collaboration with the Research Institute for Humanity and Nature of Kyoto (Japan), made possible to document the local history of indigenous watering places and of rock art sites discovered near the "watering places". We also carry out isotopic and geochemical analyzes of water, which allow the water cycle to be reconstituted and to be compare with the "hydrosocial cycle".

Unknown to scientific communities, most of these sites are linked in oral history to a little-known settlement, the Wardaa, who are described as "giants". Laboratory analysis work (geographic information system) tends to show that most "rockart" sites are correlated with other archaeological artefacts (tombs, cairns) and are located in specific ecological gradients that one can characterize both from the contour lines and the associated environmental characteristics. 3P-ART-WAT proposes to continue the implementation of an interdisciplinary approach aimed at describing the environmental complexity into which these sites fit. By collecting anthropological (oral history), ecological (soil and vegetation) and ethno-historical data, the aim is to highlight the socio-ecological dynamics of these sites, and therefore to rework the history of pastoral organizations from of their ecological materialities since 1800.

Watering sites and the wardaa hypothesis.

A set of recent studies focusing on the socio-ecological changes of societies in northern Kenya and southern Ethiopia invites us to reexamine the gabra ecology, and more broadly those of pastoral ecologies from another starting point: "The great catastrophe". Recently, scholars in historical ecology have evidenced an important climatic event ("the great catastrophe") that happened in 1800 : *Cinna*. The historical narrative of *Cinna* describe a severe drought of 20 years in Baringo and northern rift valley which was probably one of the most important in the last 750 years. Anderson (2016) suggests that the dessication of the soil provoked a big migration and the full eviction of population (mainly pastoralists) from their land. In others words, historian have described a situation of a large collapse of the "pastoral" societies of northern Kenya and southern Ethiopia and later on there reorganization. The oral history of pastoralists groups in the rift valley refers to this period as *cinna* (« *The termination of pastoral economies* ») among the Borana, "*Cinna tite guracha*" among the Gabra and *emutai* among the *maa* speakers. (Tiki, 2014; Anderson, 2015).

With regards to our research, this event suggest that a situation of environmental change on a regional scale has deeply reconfigured the social and political organizations of societies of North Kenya. Strangely, in Northern Kenya, 1800 refers to a pivotal period between proto-history and the archeology of the Holocene on one side, and history and anthropology on the other side. In our ethnographic material, this period seems associated with a shift in settlement of populations. While people were cattle breeders called *wordaa* before *cinna*, these disappear after 1840 in favour of camel breeders groups (Gabra, borana rendille). And while current ethnics identities are mostly described as the result of the territorialisation of ethnicity during colonial time (G. Schlee, 2012), we make the hypothesis that the formation of new ethnic identities (Gabra, Rendille, Arial etc.) resulted first from the re-organization of past old clans into news ethnics groups. Later the colonial process of territorialization contributed to reify an ethno-scape. Within this process, we can observe a progressive shift from pastoralist specialization to a more complex diversification due to continue socio-ecological changes in a new climate regime. For this reason, our project aims to track the convergence between ethnographical and archival records on climate variability in comparison with climatic data (soil and vegetation), but also to assess the ecological changes recorded in colonial archives. The ethnographic materials we collected can help us to describe how climate appears as a key component of the everyday political life, as

well as to climatic events from the past. Second, the data base resulting from our previous fieldworks provide many information regarding past climatic events and responses of pastoralists societies that we need to compare with archival and climatic records.

This results leads us to reconsider pastoral adaptation to climate in a more longer period and to rethink climate factor in social and political organization of arid land of northern Kenya, or "politics of climate " of the gabra, samburu or borana breeders (present in other Maasai or nilotic groups) as a residual elements of a climatic event that occurred in 1800.

Scientific objectives

How local ecology and conservation of watering places enlight regional environmental dynamics? Through a multi-scale approach (from soil and vegetation, conservation to social practices), 3P-ART-WAT focus on the nexus water – biodiversity - livelihood. The research explores how ecosystem services dynamics interact with the pastoral livelihood of an endoreic basin. 3P-ART-WAT is an interdisciplinary research project aimed at understanding the socio-ecological dynamics of arid systems from socio-ecological niches already identified and inventoried. The main objective of the project is to build multidisciplinary research and to enhance collaborations between researchers from the CNRS and Kenyan researchers from the National Museum of Kenya (archaeology department). The research group aims to involve various disciplines (history, archeology, anthropology and sociology, life and earth sciences) in order to understand the socio-ecological dynamics surrounding "watering places". The general objective of the research is also part of an understanding of the possible effects of development policies as it focuses on merging socio-ecological dynamics in order to determine sustainable trajectories in the future.

Specific objectives:

This study aims to achieve the following specific objectives:

1. To make the connection between the environmental, anthropological and archaeological research northern Kenya in order to build an understanding of rock art sites from their past ecological dynamics.
2. Establish a common chronology of the environmental dynamics of the last 500 years from an update of the state of the art built in a multidisciplinary perspective, with a specific focus on the 1800 period.
3. To model a 3D virtual reality of some specific socio-ecological niches which involve data acquisition , model and reconstruction and scenarisation.
4. Build a sedimentary and botanical history of "watering places" over the past 500 years.
5. Compare the long-term history of indigenous water management with the output of archaeological records.
6. Build a 3 D GIS model of the ecological and social dynamics of watering places by integrating sets of "heterogeneous data" (from various disciplines).

The DESCA project will especially focus on objectives 1,2,3.

Methodology

Landscape approach

3P-ART-WAT develops a synchronic and diachronic approach socio-ecological change of ecological niches linked with water through interdisciplinary research on a network of « watered places » (spring, oases.). It provides a way to better integrate past and present local conservation knowledge and practices in public policies linking biodiversity conservation and food security in the wider context of climate change. In our project, ecological dynamics are understood both as natural ecosystems dynamics and as pastoralist views of nature, that is to say the local knowledge and practices leading to the conservation of "watering places", and subsequently "rock art sites".

To overcome the dualism between biotic and anthropogenic approaches, we mobilize a landscape approach in order to understand the factors that contribute to the building and maintenance of highly productive landscapes instead of the causal chains of land degradation. The Landscape approach offers a framework within which the productive landscapes changes (terraces, irrigation canals, watered places, cultivated and improved land) and acceptance of innovation by local societies stem from societal and existing socio-ecological context. It also enables for consideration of local innovation practices to maintain natural resources (water, soil) and the conditions necessary for a change in these practices. In this context, the study of knowledges and practices of conservation of the successive local community (Wardaa, Rendille, Gabra, Borana) from the 19 century opens a way to describe the adaptive capacity or maintenance of societies facing a current situation of scarce resources (water, pasture, forests). In our project, the landscape approach will be implemented on water-places located in some specific socio-ecological gradients already identified through GIS analyses.

The proposed methodology is in line with ethical purposes and practical reasons. First, many local communities don't agree with excavation practices and they perceive archaeologists as a threat for their heritage. Second, past excavations undertaken in 1970's have been unsuccessful in finding any artefacts and claims for a new method to highlight the watering places associated with rock art sites. By focusing on the past material ecological conditions surrounding the watering places, the landscape approach allow us to practice a non-destructive approach and to implement a more comprehensive approach in which archeological data are highlight by the convergence between ethno-historical records and past ecological changes.

Working plan- agenda

	Duration (Days)	FY2022				FY 2023			
		Quarter 1	Quarter 2	Quarter 3	Quarter 4	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Launch of the project in Kenya in a theoretical and methodological International workshop at NMK Nairobi (CNRS, NMK, IFRA, JSPS)	2				October – November 2022				
Meeting to share field data, inventory of existing material at NMK, plan on data analysis, Data management plan, writing. (CNRS, NMK)	3			Already Funded	November 2022				
Acquisition 3D GIS Field survey (NMK, CNRS, PSIG EHESS)	20				November				
Symposium GDR Rift, Lyon France, Panel presentation/ discussion.	2				22 – 24 Novembre 2022.				
Detailed report on the main drivers of change in northern Kenya and bibliography will be produced by January 2023.						D			
Cataloging work on existing material at National Museum of Kenya: <i>archeological record and historical record on water places</i> (Master student)					december	January - march	March - may	D	
3D modeling and Virutal Reconstruction (CNRS, PSIG EHESS)									
Interdisciplinary field school (Workshop “zone atelier”) – Kobbifora school	20						June 2023	July 2023	
Final workshops – dissemination activities with department of tourism, culture and social services of the Marsabit county government	3								
3 D Scenarisation									
Exhibition at the National Museum of Kenya									
Writing of research reports & Publication	180								

D: Delivery

Expected Results

The program is based on a Franco-Kenyan partnership tested in the past during exploratory research workshops and joint field surveys. The research is based on the existence of an international scientific network and collaborations initiated in 2009. These collaborations involve archaeologists, such as Jack Harris (Rutgers University), Emmanuel Ndiema (NMK), (Patrick Maundu, NMK), Japanese researcher funded by the JSPS and other researchers from different disciplines.

In international debates, research on transitions and conversion of pastoral landscapes in northern Kenya aims to renew the framework of research on the ecology of arid zones in East Africa but more broadly from comparative perspectives. The multidisciplinary partnership propose to open up to theoretical and methodological perspectives useful both for the advancement of research, while the integration of senior and junior researchers, especially during the summer school by Kobbi Fora (Organized by E. Ndiema, National Museum of Kenya) will particularly benefit the youngest by enriching their expertise. At the heart of this approach, we expect nurturing a new generation of Kenyan researchers who, in the years to come, could take research into their own hands. The diversity of the team should facilitate the mobilization of knowledge to resolve issues related to research on northern Kenya in areas as diverse as understanding socio-ecological, economic, historical and political dynamics.

The expected results mainly fall within the scope of research. First, a strengthening of the partnership between the two main partners (the archeology department of the National Museum of Kenya and researchers from the Interdisciplinary Institute of Contemporary Anthropology) is expected.

The results will come from the steps of the research program: first by identifying critical thresholds for socio-ecological changes in northern Kenya; then, by discussing sustainable and possible trajectories for pastoral societies in northern Kenya. The first step is to establish an inventory of the current challenges facing the pastoral landscapes of northern Kenya (change in pastoral lifestyles, land use; implications of these changes relations and constructions of ethnicity; policies and their impacts on economic and social activities in the region). A detailed report focusing on the main drivers of change in northern Kenya and presenting, not only preliminary findings from existing literature and data, but also with a full bibliography will be produced by January 2023. By linking the trajectories of the pastoral landscapes of northern Kenya to understanding past and current adaptations, this work will also provide archaeological findings with specific data and a comprehensive bibliography. These results will be discussed during a workshop with the different actors of the project in which the researchers will present and compare the results.

In this first phase, the partners plan to develop a common methodological framework to identify possible trajectories in northern Kenya (Chalbi and Turkana). A statistical database on pastoral livelihoods in the Chalbi Desert (study carried out in 2011) will be used and enriched. The 2011 survey can serve as a benchmark against which to assess current changes. Regarding the GIS component, a series of maps will be produced in order to be disseminated as a second step. A final workshop will be organized to discuss and evaluate with the representative of the Marsabit county government and the various actors of the project, the results of the research (Valuation of cultural heritage and archeological site for the Marsabit county government). All the results of the program must provide the components of a digital observatory of northern Kenya (bibliography, statistical database, archaeological finds, maps, video). The “Africa

cluster” of the EHESS GIS platform will be one of the means of disseminating and promoting these results. The publication of a book is planned at the end of the program.

International perspectives and future potential of the collaboration:

The research is based on the existence of an international scientific network and collaborations initiated in 2009. This network brings together a first circle of collaborations involve archaeologists, such as Jack Harris (Rutgers University), Paul Lane (archaeologist, University of Cambridge), and other researchers from different disciplinary horizons (Michel Brossard, IRD, members of the African GDR Rift). Following the IFRA seminar on governance of natural resources in light of environmental stress (2012), the team tries to set up a “workshop zone”, conceived as an interface between academic research, Kenyans students, managers of heritage and stakeholders of development in East Africa. The implementation of this workshop in Marsabit County should lead to establish comparisons and activities with research programs such as “la zone atelier Hwange (Zimbabwe)” and some similar situations in southern Ethiopia.

More widely, a specific collaboration around the translation of Japanese research carried out in northern Kenya exists through the office of the Japanese Science Foundation in Nairobi and its director (Daisuke Misoguchi). It also culminated in a workshop in collaboration with researchers from Kyoto University on desertification (EHESS, October 15, 2015). Collaborations also exist with David K. Wright (Palaeo-ecologist) from the University of Seoul (South Korea). In international debates, research on transitions and conversion of pastoral landscapes in northern Kenya aims to renew the framework of research on the ecology of arid zones in East Africa but more broadly from comparative perspectives

PARTIE C. Budget

No	Items	Detailed Justification	Number of people (or cars)	Number of days/weeks	Unit cost	Total amount in euros
TRAVEL						
	Ground Transportation (Landcruiser rental)	Field survey Vehicles @100 Euro for 40 days (includes driver allowance and fuel)	1	40	€ 100	€ 4 000
	Flight	Kick off workshop, NMK, Nairobi (November 2022)				€ 2 000
	Flight	Symposium GDR rift, Lyon 22-24 novembre 2022				€ 2 000
		Sub Total				€ 8 000
ACCOMMODATION &						
	Accommodation In Nairobi (Kick off meeting)	Theoretical and methodological workshop at NMK Nairobi (June 2021) with relevant partners (NMK, IFRA, IIAC, Marsabit county)				€ 1 000
	Accommodation and camping Gear (Field)	GIS Field trip (2022) and Workshop Kobbi Fora (June 2023)	4	25	€ 50	€ 5 000
		Final meeting with Marsabit authority december 2023				€ 1 500
	Subsistence (Field)	Food @ 15 USD for 8 PAX for 20 days	5	20	€ 15	€ 1 500
		Sub Total				€ 9 000
PERSONNEL						
	Local Community gifts to	Elders and local guides from Local community in line with	1	1	€	€ 100
		Sub Total				€ 100
OTHERS						
	Printing and GIS based	The Museum in Nairobi has limited printing resources.	1	1	€ 100	€ 100
	Internship NMK - IIAC - GIS	6 months - gratification	1	90		€ 3 000
	micro botanical data.			100	€ 20	€ 2 000
	Research permit		1		€ 500	€ 500
	Publication (book)		1			€ 2 000
		Sub Total				€ 5 100
COMMUNICATION						
	Sat/Communication	Satellite Phone Communication and data @ \$25per day for 20 days •## to				€ 100
		Sub Total				€ 100
		Sub-Total				€ 22 400

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McGabe J.T. (2004) Cattle bring us to our enemies. Turkana Ecology, Politics and raiding in a disequilibrium System, university of Michigan, 301 p.

Report

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2012 Natural protected areas and dynamics of Pastoralist heritage in Marsabit greater ecosystem (Northern Kenya): Intermediary report, 18p. <http://www.iac.cnrs.fr/CentreEdgarMorin/spip.php?article628>

Movies

2012

Guerre de l'eau dans les puits chantants (Marsabit ; Kenya). Durée 13minutes 37

Lien : http://www.iac.cnrs.fr/spip.php?page=article-axe-pole-media&id_article=425

1- Emmanuel K. Ndiema, PhD.

Present Address

National Museums of Kenya
 Dept. of Earth Sciences
 P.O. Box 40658-00100
 NAIROBI, Kenya
 Tel 254-20-3742131/3 or 254-20-3743161/3
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Permanent Address

P.O. Box 11124-00100
 NAIROBI, KENYA
 Cell Phone 254-722-980171

Email: endiema@museums.or.ke, or endiema@gmail.com or ndiema@shh.mpd.de

Nationality: Kenyan

Languages: English and Kiswahili (Written and Spoken), French (Elementary) also fluent in 10 different African languages and dialects

Research Expertise

Environmental Change and Cultural Adaptation
 Archaeological Geochemistry
 Trade and Exchange
 Cultural Resource Management (CRM)
 GIS (Geographic Information Science)
 Environmental and Social Impact Assessment

Educational Background

- 2011 PhD Dissertation** title “*Mobility and subsistence patterns among mid Holocene pastoralists at Koobi Fora, northern Kenya: new archaeological sites and evidence from obsidian sourcing and geochemical characterization* Department of Anthropology at Rutgers, The state University of New Jersey (USA)
- 2007- MA in Anthropology**, Rutgers the State University of New Jersey, my research was on “Modeling the spatial dynamics of Early Pastoralism at Koobi Fora Kenya”

- 2002:** **M. A in Archaeology**, University of Nairobi. My research was on “*Human Adaptive Strategies. During the Holocene in Eastern Lake Turkana: A Micro-wear and functional analysis*”
- 1999:** **University of Nairobi**, BA Archaeology & literature (Second Class Honors Upper Division)

Specialised Training:

- 2020: May, Executive Leadership Development in Heritage Management**, Strategic Planning for Heritage Managers. Online Training by Heritage Management Organization, Athens, Greece.
- 2019: March-May Strategic Leadership Development Program (SLDP)**, Kenya School of Government, Baringo Campus.
- 2018:** International application of archaeological science at the Max Planck Institute for the Science of Human History, Archaeology Department Jena, Germany.
- 2017:** High Level Training Course on World Heritage under the framework of Digital Belt and Road, Beijing and Zhengzhou, China.
- 2017:** HSE International certificate, Environmental and Social Impact Assessment Focus on Oil and Gas Projects-Ministry of Energy and Petroleum by HSE
- 2015:** Pre-TWDG Biodiversity Informatics Training Workshop Multi Media University Workshop Sept 22nd-25th 2015
- 2015:** Introduction to the Principles and Practice of Stable Light Isotope Analysis, University of Cape Town from 9-13 June 2014.
- 2013:** Workshop on mapping heritage cultural resources using 3D technology, University of Cape Town March 13th-24th 2013
- 2013:** Workshop on Scientific writing, Institute of Primate Research, May 13th -17th 2013 Nairobi
- 2012:** ICDP workshop on scientific drilling of Lake Challa: Climate and ecological history of equatorial East Africa, Nairobi and Taveta, 10-13 September 2012

Professional Employment/Projects

- 2014-Present:** Senior Research Scientist and Head of Archaeology Section, National Museums of Kenya, Department of Earth Sciences
- 2019-Present** Co-Investigator, Long Term Perspectives on Water Security, Food Security, and Land Management Among Pastoralists Experiencing Change.
- 2019-Present** Co-Principal Investigator, Biological and behavioral adaptations to ecological

variability through time in the Turkana Basin

2018-Present: Lead Consultant, Archaeological and Cultural Heritage Impact Assessment for; **Kipeto Energy, Isiolo Solar Project, Olsuswa Energy Geothermal project, Lake Turkana Wind Power.**

2017-Present: Research associate, Max Planck Institute for the Science of Human History, Jena, German

2016-Present: Consultant, Kenya Defense Forces, Cultural Impact Assessment and development of military museum.

2011-Present: Lead consultant, Heritage impact assessment and Mitigation during seismic survey in gas and oil Exploration in Turkana Basin by Tullow Oil and CEPSA companies.

2013- 2014: Lead consultant, Heritage impact assessment and cultural heritage audit on British Army Training Sites in Kenya.

2007-Present: Field Director Koobi Fora Field School of Paleoanthropology (George Washington University and National Museums of Kenya) responsible for leading lectures and directing field excursions in the Holocene Galana Boi Formation.

2008: Present: Senior Investigator Mt. Elgon Elephant Monitoring Project and the archaeology of Mt Elgon area collaboration with Peter Powell, Carmel California

2008-Present: Co-PI the archaeology of Karura Caves Nairobi collaboration between British Institute in Eastern Africa and Friends of Karura Forest, Kenya

2008-Present: Co-PI Early herding and monumental architecture in the West Turkana, Kenya collaboration with the Liza Hildebrand Stony Brook University

2007/9- Lecturer, Department of Africana Studies, and Centre for African Languages, Rutgers University, USA

Honors/Awards

2020: Project PI Kenya Heritage capacity Mapping (EUR, 5000) in Collaboration with Heritage Management Organization.

2019- Conference/Workshop Grant (USD 20,000) from the Wenner Gren Foundation for Anthropological Research, For Organizing the 8th East African Association Paleoanthropology and Paleontology.

2018- Research Grant (EURO 40,000) from The French Embassy (Innovative Projects for Civil Society and Coalition of Actors) for rehabilitation of historical water canal and development agribusiness.

- 2017-** Research Grant (USD 400,000) from the Amazon Web services and Intel Digitization of museum collection at department of earth Sciences. Implemented in partnership with digital Data Divide)
- 2015:** Research Grant (#CER.2015.05540) from Prince Clause fund **Raising awareness and conservation of rock in**, Mt Elgon caves, Bungoma County
- 2015:** International Collaborative Grant from Wenner-Gren Foundation for anthropological Research Archaeological and environmental history around Mt Elgon western Kenya.
- 2014:** Research Grant (#CER.2014.05406) from Prince Clause fund Damage Assessment Mission in Kenya, Mt Elgon caves, Bungoma County.
- 2013:** Research Grant (#CER.2013.04786) from Prince Clause fund awareness raising program on Rock Art and cultural heritage in the Mt Elgon caves, Kenya
- 2013:** Award by the International Foundation for Science (IFS) to aid research in Molecular characterization guinea fowl species in the savannah and forest regions of Kenya towards conservation and sustainable farming in collaboration with
- 2013:** Post-doctoral research grant from Paleontological Scientific Trust (PAST) for research in Turkana Basin
- 2012:** Minor research grant, British Institute in Eastern Africa (BIEA) and Trust for African Rock art (TARA) to aid research in Kakapel, Kenya
- 2010-11:** Wadsworth write-up International Fellowship, by the Wenner-Gren Foundation for anthropological research.
- 2008-09:** Paleontological Scientific Trust (PAST) and National Research Foundation (NRF) Research grant for collaborative research at University of Cape Town, Republic of South Africa
- January 2009:** International Collaborative Grant by the Wenner-Gren Foundation to aid research in the Archaeology of Lokori (USD\$33,000)
- 2008:** Research grant by British Institute in Eastern Africa (BIEA) and Trust for African Rick Art, to undertake Rock Art Survey at Lokori, Turkana East.
- 2008:** Prize award by the International Organization for Obsidian Studies for a paper presented at the Society of American Archaeologists (SAA) 2007 Austin, Texas, USA
- 2005-11: Wadsworth International Fellow formerly IPDF**, Wenner-Gren Foundation for anthropological research.
- 2006-07:** Center for Human Evolutionary Studies, Rutgers University, Predoctoral research grant

Conferences and Publications

- Ndiema, E. K.** (2020). Tracing Prehistoric Trade and Economic Links between the East African Coast and East Asia. China and East Africa: Ancient Ties, Contemporary Flows, 23

- Faulkner, P., Shipton, C., Crowther, A., **Ndiema, E.**, Petraglia, M., Boivin, N., (2020). Pleistocene to Holocene Transitions in the Kenyan Hinterland: Evidence from the Panga ya Saidi Marine Molluscs. *Journal of Island and Coastal Archaeology*
- Roberts, P., Prendergast, M., Janzen, A., Shipton, C., Blinkhorn, J., Zech, J., Crowther, A., Sawchuk, E., **Ndiema, E.**, Petraglia, M., Boivin, N., (2019). Late Pleistocene to Holocene human palaeoecology in the tropical environments of coastal eastern Africa. *Paleogeography, Paleoclimatology, Paleoecology*
- Ndiema K. E** and Di Lernia Savino, (2019), Rock Art, an African Legacy. Conference by the Italian Embassy, Sept 2019, Nairobi Kenya
- Prendergast, M. E., Lipson, M., Sawchuk, E. A., Olalde, I., Ogola, C. A., Roland, N., ... & Callan, **K. Ndiema K E.** (2019). Ancient DNA reveals a multistep spread of the first herders into sub-Saharan Africa. *Science*
- Hildebrand, E. A., Grillo, K. M., Sawchuk, E. A., Pfeiffer, S. K., Conyers, L. B., Goldstein, S. T. & **Ndiema K E.** (2018). A monumental cemetery built by eastern Africa's first herders near Lake Turkana, Kenya. *Proceedings of the National Academy of Sciences*, 201721975.
- Ashley, G.M., **Ndiema, E.K.**, Spencer, J.Q.G. et al (2017) Paleoenvironmental Reconstruction of Dongodien, Lake Turkana, Kenya and OSL Dating of Site Occupation During Late Holocene Climate Change *Afr Archaeol Rev* (2017). <https://doi.org/10.1007/s10437-017-9260-4>
- Ndiema K E** and Kiura P. (in Press) "" The archaeology of Mt Elgon in western Kenya
- Panyako, 2016 P. M., T. Imboma, D. W. Kariuki, M. Makanda, P. A. Oyier, P. Malaki, E. K. **Ndiema K E.** "Phenotypic characterization of domesticated and wild helmeted Guinea fowl of Kenya."
- Grace Moraa and **Ndiema, K E** (2016). Diversity, Genetic Background and Hsp70 Gene Functional Polymorphisms for Heat Tolerance in Indigenous Chickens in Kenya. IBR, JKUAT, 2016.
- Ndiema K.E, Borona G.** (2014) "Merging Research, Conservation and Community engagement: perspectives from TARA's rock art community projects in Kenya" *Journal of Cultural Heritage Management and Sustainable Development* 4:2, pp184-195
- Ndiema K.E. and Beyin A.** (2014) "Upholding the Legacy: East African Association for Paleanthropology and Paleontology held its 4th biannual meeting in Kenya" *Evolutionary Anthropology* Issue 23(2)
- Ndiema K.E,** (2013) the archaeology of Chepnyalil cave recent excavations. Paper presented at the 4th EAAPP conference; 29 July -2 August 2013 Mombasa, Kenya.
- Ndiema K.E,** (2013) The rock art of Turkana Basin, research, conservation and local identity. Paper presented at Colloquium/Exhibition during the 50th anniversary of the AU; 22-24 May 2013 Addis Ababa, Ethiopia.
- Ndiema K. E, et.al** (in Press) Archaeological investigations at Karura Caves: Preliminary report.

Ndiema K.E., *et.al* (2013) Kenya and Oil Exploration in sensitive cultural landscapes; The case of Tullow oil in lake Turkana Basin, Kenya. Paper presented at the 7th World Archaeological Congress Dead Sea Jordan. 14th-21st January 2013

Ndiema K. E., *et.al* 2011 Transport and Subsistence Patterns at the Transition to Pastoralism, Koobi Fora, Kenya. *Archaeometry* 53: 1085-1098.

Ashley M G, **E. K. Ndiema**, .G. Spencer, J. W.K. Harris, and P W. Kiura (2011),Paleoenvironmental Context of Archaeological Sites, Implications for Subsistence Strategies under Holocene Climate Change, Northern Kenya. *Geoarchaeology: An International Journal*, Vol. 26:6 pp.809–837

Ndiema K.E., (2010) Development intervention or Rock Art Vandalism? Insights from North- Rift valley, Kenya Paper presented at an International rock art conference on “conservation of African rock and challenges in the face of threats of theft and vandalism” at El Smara, Morocco 19th-21th August 2010

Ndiema K.E., *et.al* (2010). Interaction and Exchange across the Transition to Pastoralism, Lake Turkana, Kenya. In C.D. Dillian and C. L. Brown (Ed), Trade and Exchange: Archaeological studies from History and prehistory, Springer, New York, pp. 95-108.

Ndiema K.E.,*at.al* (2009) Modeling mobility patterns of Early pastoralism at Koobi Fora Kenya: evidence form Obsidian Sourcing and Characterization. Paper presented at the 2nd East Africa Association of Paleontologists and Paleoanthropologists (EAAPP), meeting at Arusha, Tanzania 19th-25th August 2009

Ndiema K.E.,*at.al* (2009) Modeling mobility patterns of Early pastoralism at Koobi Fora Kenya: evidence form Obsidian Sourcing and Characterization. Paper presented at the 2nd East Africa Association of Paleontologists and Paleoanthropologists (EAAPP), meeting at Arusha, Tanzania 19th-25th August 2009.

Ndiema K.E., (2009) Ancient pastoralism lifestyles at Koobi Fora Kenya: evidence form Obsidian Sourcing and Characterization. Paper presented at the 2nd East African Quaternary Association (EAQUA) meeting at Addis Ababa, Ethiopia 19th-25th April 2009.

Ndiema K.E., Braun D, and Dillian C L. (2008) Holocene Pastoralists Adaptations in East Africa: How similar or different was it from that of South Africa? Paper presented at the Association of Southern African Archaeologists (ASAPA) s Conference, Cape Town RSA, April 25-30th 2008.

2- Christine Adongo

Disciplines: Environmental science, Anthropology

Position: PhD Student/ early stage researcher

Address: Ecole des Hautes Etudes en Sciences Sociales
190-198 avenue de France, 75013, (PARIS, FRANCE)

Education

2013 – Present: PhD in Anthropology (EHESS, Paris)

2012: Master of Environmental science (Kenyatta University, Kenya)

2006: Bachelor of environmental science (Kenyatta University)

Work Experience

2012: Environmental Consultant (IFRA): comprehensive livelihoods study including WASH and climatic changes in Northern Marsabit.

2008 – 2011: Research assistant: CORUS project on Kaya forests run by IRD in collaboration with NMK (Fort Jesus Museum Mombasa).

2007 – 2008: Research assistant NMK (Fort Jesus Mombasa)

Current position and activities

I am an early stage researcher doing a PhD in anthropology under the broad theme of resilience in East African landscapes. I am looking at green economies, particularly green energy projects and how they interact with pastoral landscapes and pastoralists.

Relevant expertise

I have a strong background in environmental science and now anthropology. I, therefore, have strong knowledge and experience with both quantitative and qualitative research methodologies. Besides working with Dr Benoit Hazard in Northern Kenya since 2011, where I have focussed on: climate variability (adaptive capacities, local /'traditional' adaptation, livelihood diversification, WASH as well as broader socio-ecological change), I also have expertise in spatial analysis.

Recent publications

2015 (with B. Hazard) « *Green grabbing et modèles de conservation dans le comté de Marsabit* », in Cahier de l'Afrique de l'Est (accepted, to be publish in october)

The steaming landscapes, People and land, REAL Magazine, 36-38.

2014 Natural protected areas and the dynamics of pastoralist economies in light of environmental stress: Marsabit county (Northern Kenya), in Regional Environmental change, Springer ed. (soumis).

2013 *Guerre de l'eau dans les « puits chantants » (Marsabit Kenya)*, durée 16 minutes. Auteurs : Benoit Hazard & Christine Adongo. Montage : Arghyro Paouri. En ligne:

<https://archive.org/details/GuerreDeLeauDansLesPuitsChantantsmarsabitKenya>

2012 (With B. Hazard, Adano Wario, Martin Ledant) Comprehensive study of pastoral livelihoods, Wash and natural resource management in Northern Marsabit (Kenya), Institut Français de Recherche en Afrique & Solidarités international, 92 p.

3_ Benoit Hazard

Anthropologue, Chargé de Recherche 1^{ère} classe, CNRS

(Monsieur)

Docteur en Anthropologie, Qualifié Maître de
conférence par le CNU (Section 19: sociologie
démographie et Section 20: Anthropologie)

Né le 23 février 1971

(Croix, France)

Nationalité française,

Marié, 2 enfants.

89 rue Pierre Curie 93380 Pierrefitte/Seine

Tel : 01 42 35 19 69 Courriel : bhazard@ehess.fr

CURSUS UNIVERSITAIRE

* **2007 Thèse de Doctorat en Anthropologie Sociale de l'EHESS**, Mention « très honorable avec les félicitations du jury à l'unanimité » *L'aventure des Bisa dans les ghettos de « l'Or Rouge » (Burkina Faso-Italie). Trajectoire historique et recomposition des réseaux migratoires burkinabé dans la région des Pouilles* (Soutenue le 12/12/2007).

EXPERIENCE PROFESSIONNELLE

Activités de recherche et d'enseignements

* **2009-2017 Anthropologue, Chargé de recherche , 1^{ère} classe au CNRS (Section 38). Affecté au IIAC (UMR 8177 CNRS-EHESS)**

* **2008-2009** Chargé de mission « Contrat quadriennal » auprès de la Présidence de l'EHESS (Direction du développement de la recherche).

* **2007– 2002 Attaché Temporaire d'Enseignements et de Recherches** (temps partiel, 2004-2006), puis chargé de cours (2006-2007) à l'Ecole des Hautes Etudes en Sciences Sociales.

* **2002- 1999 Allocataire de recherche** à l'Ecole des Hautes Etudes en Sciences Sociales, Doctorant associé au Centre d'Etudes Africaines (Thèse *Du campement ivoirien au ghetto italien. Vers une recomposition des réseaux migratoires burkinabé.*

Activités administratives et d'intérêt général

2016 - ... Membre du conseil pédagogique de la formation Economies Comparative du Développement, EHESS-Paris.

2013-2017 Membre du conseil de laboratoire de l'Institut Interdisciplinaire d'anthropologie du contemporain (UMR 8177, CNRS-EHESS)

2013-2016, Responsable de l'axe 1 « environnement : écosystème matériel et immatériel » du IIAC (UMR 8177)

2013-2011 Directeur du programme scientifique « Patrimoine africains », FMSH – Paris.

2011-2012 Chargé de mission auprès de la direction scientifique de la FMSH-Paris.

2009-2011 Représentant des chercheurs du CNRS au Conseil Pédagogique de la formation doctorale de Sociologie de l'EHESS (responsable Philippe Bataille).

2004-2006 Conseil pédagogique de la mention anthropologie sociale du Master de sciences sociales de l'EHESS.

Participation à des comités scientifiques

* Comité scientifique des JCEA 2018 – Rencontres des Jeunes Chercheur.e.s en Etudes Africaines.

* Comité de sélection des bourses Fernand Braudel-IFER incoming (Décembre 2011 et décembre 2012, juin 2013).

* Comité scientifique des Journées de géographie tropicale, Toulouse, 16-19 mars 2011.

* Conseil scientifique annuel de la Maison des sciences de l'Homme Ange Guépin, Nantes, 8-9 novembre 2010.

* Conseil Pédagogique de la formation de Master sociologie, EHESS, 2010-2012.

* Commission des usagers des nouvelles technologies de l'information et de la communication (CUTICE), EHESS, 2010-2013.

Activités de recherches (financement, bourses, distinctions)

Projets financés

2016-2018 Coordinateur du Pamoja Hubert Curien (Les paysages pastoraux dans l'anthropocène : identifier les seuils critiques et les trajectoires soutenable), EHESS, IFRA, National Museum of Kenya & Jaramogi Oginga Odinga University of Science and Technology (JOUST).

2013-2017 Coordinateur français du projet REAL (Résilience et adaptation des paysages en Afrique de l'Est), FP7-People-2013-ITN Marie Curie.

2012-2013 Coordinateur du programme NAPAST (Natural Protected areas and dynamics of pastoralist heritage, IFRA Nairobi), Programme Herego-Parego de l'IRD.

2011-2012 Contrat IFRA (DFID/Solidarités international) Etude compréhensive des modes de subsistances pastoraux, de l'eau et de la gestion des ressources naturelles du district de Marsabit (Nord Kenya)

2009 Étude comparative sur les réseaux formels et informels de transferts de fonds vers l'Afrique subsaharienne GRET – Banque Mondiale.

Bourses & distinctions

2016 Bourse de la fondation japonaise pour la science pour un séjour de deux mois au Research Institute for Humanity and Nature (RIHN), Kyoto.

2005 « **Grant Africana** »: bourse pour un séjour de recherche de deux mois à la « **Melville Herskovits Africana Library** » (Northwestern University, Etats-Unis).

Participation à des comités d'évaluation et comités de lecture

Comités d'évaluation

2011-2012 Rapporteur au comité de sélection des bourses IFER incoming Fernand Braudel (Décembre 2011 et décembre 2012).

2010 Comité d'évaluation scientifique de la MSH Ange Guépin, Nantes.

2009-2013 Commission des usagers des technologies de l'information et de la communication (CUTICE, présidée par Patrick Fridenson), nommé par le Conseil scientifique de l'EHESS. **Participation à des comités de lecture de revues**

Comité de rédaction des cahiers d'études Africaines (2010- ...) & Comité de rédaction de la revue Communication (2011-...)

Membre du Conseil d'administration de la Société des Africanistes.

LANGUES ET COMPETENCES INFORMATIQUES

Langues : Anglais : Lu, parlé, écrit. Italien : Lu, parlé. Langues africaines : Moore, Lebir, Swahili (débutant).

Interface pour l'édition électronique : lodel sur revue.org ; jGalith pour Persée ; carnet de recherche.

Informatique : Traitement de texte (Word, etc.), Tableurs & bases de données (Excel, Access, Sphinx), Logiciel graphique (Illustrator), Système d'information géographique (Arcgis)

Outils de gestion documentaires : **Endnote**